caring for the environment

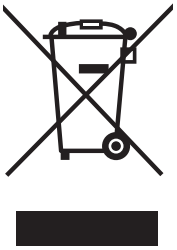
Installation, use and maintenance manual

K18 Simplygas

Modulating, condensing gas absorption heat pump, using aerothermal renewable energy and natural gas for heating and buffer tank domestic hot water production

Nominal heat output 18,9 kW

DISPOSAL
The appliance and all its accessories must be disposed of separately in accordance with the regulations in force.



Use of the WEEE symbol (Waste Electrical and Electronic Equipment) indicates that this product cannot be disposed of as household waste. Proper disposal of this product helps to prevent potential negative consequences for the environment and human health.

Revision: J
Code: D-LBR687

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I INTRODUCTION

Installation, use and maintenance manual

This Manual is an integral part of the K18 Simplygas unit and must be handed to the end user together with the appliance.

I.1 RECIPIENTS

This Manual is intended for:

- ► End user, for appropriate and safe use of the appliance.
- ► Qualified installer, for correct appliance installation.
- ► Planner, for specific information on the appliance.

I.2 CONTROL DEVICE

In order to work, the K18 Simplygas unit requires a control device to be connected by the installer (see Paragraph 1.7 *p. 16*).

II SYMBOLS AND DEFINITIONS

II.1 KEY TO SYMBOLS

DANGER

WARNING

NOTE

PROCEDURE

REFERENCE (to other document)

II.2 TERMS AND DEFINITIONS

DHW = Domestic Hot Water.

Appliance/Unit = equivalent terms, both used to designate the gas powered absorption heat pump.
TAC = Technical Assistance Centre authorised by Robur.
External request = generic control device (e.g. thermostat, timer or any other system) equipped with a voltage-free NO contact and used as control to start/stop the unit.
Ambient chronothermostat OCDS007 = control device to control a K18 Simplygas appliance.
OQLT021 system controller = control system to control a K18 Simplygas appliance, one or more heating circuits and DHW production.
GUE (Gas Utilization Efficiency) = efficiency index of gas heat pumps, equal to the ratio between the thermal energy produced and the energy of the fuel used (relative to LCV, lower calorific value).
First start-up = appliance commissioning operation which may only and exclusively be carried out by a TAC.
GHP10/GHP11 Board = electronic board on the unit, to control all functions and to provide interface with other devices and with the user.

III WARNINGS

III.1 GENERAL AND SAFETY WARNINGS

Installer's qualifications

Installation must exclusively be performed by a qualified firm and by qualified personnel, with specific knowledge on heating, cooling, electrical systems and gas appliances, in compliance with the laws in force in the Country of installation.

Declaration of conformity

Upon completing installation, the installing firm shall issue to the owner/client the appliance's workmanlike conformity declaration, according to national/local regulations in force and the manufacturer's instructions/provisions.

Misuse

The appliance must only be used for the purposes for which it has been designed. Any other use is deemed hazardous. Incorrect use may affect operation, duration and safety of the appliance. Adhere to the manufacturer's instructions.

Use of the appliance by children

The device can be used by children over 8 years old, and by people with reduced physical, sensory or mental capabilities, or lack of experience or knowledge, only if they are under surveillance or after they have received instructions regarding safe use of the appliance and understanding the dangers inherent in it. Children should not play with the appliance.

Hazardous situations

- Do not start the appliance in hazardous conditions, such as: gas smell, problems with the plumbing/electrical/gas system, parts of the appliance under water or damaged, malfunctioning, disabling or bypassing control and safety devices.
- In case of danger, request intervention by qualified personnel.
- In case of danger, switch off the electrical power and gas supplies only if this can be done in total safety.
- Do not entrust children, persons with physical, sensory

or mental disabilities or persons with poor knowledge and experience with use of the appliance.

Gas component tightness

- Before performing any operation on gas ducting components, close the gas valve.
- Upon completing any procedure, perform the tightness test according to regulations in force.

Gas smell

If you smell gas:

- Do not use electrical devices such as telephones, multimeters or other equipment that may cause sparks next to the appliance.
- Shut off the gas supply by turning the valve off.
- Switch off the power supply via the external disconnect switch in the power supply electrical panel.
- Use a telephone away from the appliance to ask for intervention from qualified personnel.

Poisoning

- Ensure the flue gas ducts are tightness and compliant with the regulations in force.
- Upon completing any procedure, ensure the tightness of the components.

Moving parts

The appliance contains moving parts.

- Do not remove guards during operation, and in any case prior to disconnecting the power supply.

Burn hazard

The appliance contains very hot parts.

- Do not open the appliance and do not touch internal components before the appliance has cooled down.
- Do not touch the flue gas exhaust before it has cooled down.

Pressure vessels

The appliance has a sealed circuit classified as pressure vessel, the tightness of which is tested by the manufacturer.

- Do not carry out any intervention on the sealed circuit or on the appliance's valves.

Water-ammonia solution

The unit uses the ammonia-water absorption cycle. The water-ammonia solution is contained in the tightness circuit. The solution is harmful for health if it is ingested, inhaled or comes in contact with the skin.

- In the event of coolant leak keep away and disconnect the power and gas supply (only if it is possible to do so with no danger).
- Ask for TAC intervention.

Electrocution hazard

- Disconnect the electrical power supply before any operation on appliance components.
- For electrical connections exclusively use compliant components and according to the specifications provided by the manufacturer.
- Ensure the appliance cannot be accidentally switched back on.

Earthing

Electrical safety depends on effective earthing system, correctly connected to the appliance and installed according to the regulations in force.

Distance from combustible or flammable materials

- Do not deposit flammable materials (paper, diluents, paints, etc.) near the appliance.

Limescale and corrosion

Depending on the chemical/physical properties of the system water, limescale or corrosion may damage the appliance (Paragraph 3.8 *p. 27*).

- Check system sealing.
- Avoid frequent top-ups.

Chloride concentration

The concentration of chlorides or free chlorine in the system water must not exceed the values in Table 3.2 *p. 27*.

Aggressive substances in the air

Halogenated hydrocarbons containing chlorine and fluorine compounds cause corrosion. The air of the installation site must be free from aggressive substances.

Acid flue gas condensate

- Discharge the acid condensate of combustion flue gas, as indicated in Paragraph 3.12 *p. 29*, in compliance with current exhaust regulations.

Switching the appliance off

Disconnecting the power supply while the appliance is running may cause permanent damage to internal components.

- Except in the event of danger, do not disconnect the power supply to switch off the appliance, but always and exclusively act through the provided control device for heating service (OQLT021, OCDS007, or external request) or for DHW service (OQLT021 or external request).

In the event of failure

Operations on internal components and repairs may exclusively be carried out by a TAC, using only original parts.

- In the event of failure of the appliance and/or breakage of any component, do not attempt to repair and/or restore and immediately contact the TAC.

Routine maintenance

Proper maintenance assures the efficiency and good operation of the appliance over time.

- Maintenance must be performed according to the manufacturer's instructions (see Chapter 7 *p. 48*) and in

compliance with current regulations.
- Appliance maintenance and repairs may only be entrusted to firms legally authorised to work on gas appliances and systems.
- Enter into a maintenance contract with an authorised specialised firm for routine maintenance and for servicing in case of need.
- Use only original parts.

Decommissioning and disposal

If the appliance is to be disposed of, contact the manufacturer for its disposal.

Keep the Manual

This Installation, use and maintenance manual must always accompany the appliance and must be handed to the new owner or installer in the event of sale or removal.

III.2 CONFORMITY

EU directives and standards

The absorption heat pumps of the K18 series are certified as conforming to standard EN 12309 and comply with the essential requirements of the following Directives:
- ► 2016/426/EU "Gas Appliances Regulation" as amended and added.
- ► 2014/30/EC "Electromagnetic Compatibility Directive" as amended and added.
- ► 2014/35/EC "Low Voltage Directive" as amended and added.
- ► 2006/42/EC "Machine Directive" as amended and added.
- ► 2014/68/EU "Pressure Equipment Directive" as amended and added.
- ► 811/2013/EU "Energy-Related Products regulation" as amended and added.
- ► 813/2013/EU "Ecodesign requirements regulation" as amended and added.

Furthermore, they comply with the requirements of the following standards:
- ► EN 378 Refrigerating systems and heat pumps.

Other applicable provisions and standards

The design, installation, operation and maintenance of the systems shall be carried out in compliance with current applicable regulations, depending on the Country and location, and in accordance with the manufacturer's instructions. In particular, regulations regarding the following shall be complied with:
- ► Gas systems and equipment.
- ► Electrical systems and equipment.
- ► Heating and cooling systems, and heat pumps.
- ► Environmental protection and combustion products exhaust.
- ► Fire safety and prevention.
- ► Any other applicable law, standard and regulation.

III.3 EXCLUSIONS OF LIABILITY AND WARRANTY

Any contractual or extra-contractual liability of the manufacturer for any damage caused by incorrect installation and/or improper use and/or failure to comply with regulations and with the manufacturer's directions/instructions shall be disclaimed.

In particular, the warranty on the appliance may be rendered void by the following conditions:

- Incorrect installation.
- Misuse.
- Failure to comply with the manufacturer's indications on installation, use and maintenance.
- Alteration or modification of the product or any part thereof.
- Extreme operational conditions or however outside of the operational ranges set forth by the manufacturer.
- Damages caused by external agents such as salts, chlorine, sulphur or other chemical substances contained in the installation water or present in the air of the installation site.
- Abnormal actions transmitted to the appliance by the system or installation (mechanical stresses, pressure, vibrations, thermal expansion, electrical surges...).
- Accidental damages or due to force majeure.

1 FEATURES AND TECHNICAL DATA

1.1 FEATURES

1.1.1 Available range

A distinction must be made from the application perspective based on the type of service provided:

A. Systems for space heating only.

B. Systems for space heating and DHW production, with basic DHW functionality.

C. Systems for space heating and DHW production, with advanced DHW functionality and management of one or more heating circuits.

Systems for space heating, DHW production and heating circuit management require the use of the optional OQLT021 system controller.

All K18 Simplygas appliances are available in the **outdoor installation** version.

Figure 1.1 *Available range for the family of K18 systems*

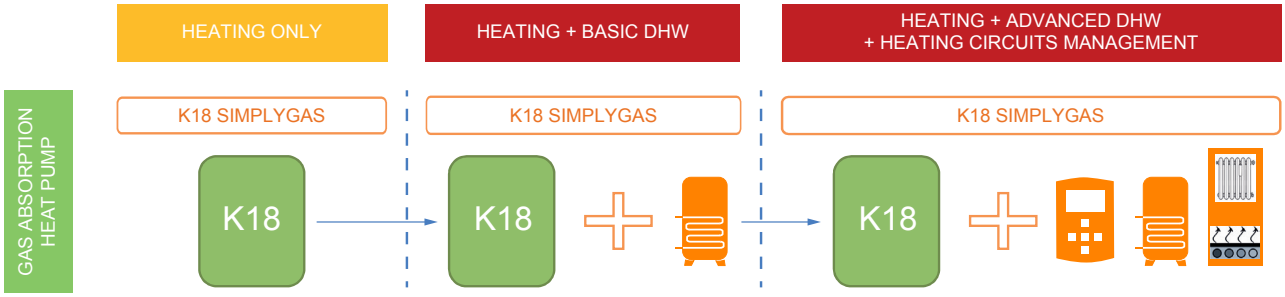


Table 1.1 *Selection guide*

Heating only	Space heating + basic DHW	Space heating + advanced DHW + heating circuits management
K18 Simplygas - aerothermal gas heat pump - heating efficiency 169% - use of aerothermal renewable energy for heating hot water production up to 65 °C - heat input 11,2 kW - delivered heat output 18,9 kW	**K18 Simplygas** - aerothermal gas heat pump + 200/300 liter DHW buffer tank (optional) - use of aerothermal renewable energy for heating hot water production up to 65 °C - use of aerothermal renewable energy also for buffer tank DHW production up to 70 °C - heat input 11,2 kW - delivered heat output 18,9 kW	**K18 Simplygas** - aerothermal gas heat pump + system controller (required) + 200/300 liter DHW buffer tank (optional) - use of aerothermal renewable energy for heating hot water production up to 65 °C - use of aerothermal renewable energy also for buffer tank DHW production up to 70 °C - controlling secondary zone circuits (via the system controller) - heat input 11,2 kW - delivered heat output 18,9 kW

1.1.2 Operation

The K18 Simplygas heat pump is based on the thermodynamic water-ammonia absorption cycle (H_20–NH_3), and produces hot water using outdoor air as a renewable energy source (cold source) and natural gas as primary energy.

The thermodynamic cycle takes place within a hermetically sealed circuit, in welded construction, perfectly tight, factory-tested, which does not require any maintenance or coolant top-ups.

1.1.3 Mechanical and thermo-hydraulic components

- Steel sealed circuit, externally treated with epoxy paint.
- Sealed combustion chamber suitable for outdoor installations.
- Burner equipped with ignition and flame detection device, controlled by an electronic controller.
- Titanium stainless steel shell-and-tube water exchanger.
- Stainless steel, shell-and-tube recovery exchanger of flue gas latent heat.
- Air exchanger with finned coil, with steel pipe and aluminium fins.
- Automatic microprocessor-controlled finned coil defrosting valve.
- Standard supplied water pump.

1.1.4 Control and safety devices

- GHP10/GHP11 electronic board with microprocessor, display and selection keys.
- Water flowmeter.
- Generator limit thermostat, with manual reset.
- Flue gas thermostat, with manual reset.
- Sealed circuit safety relief valve.
- Bypass valve, between high and low-pressure circuits.
- Flame control board.
- Double shutter electric gas valve.
- Antifreeze functions for hydraulic circuit.
- Condensate discharge sensor.

1.1.5 Controlling an optional auxiliary boiler (external)

A control system has been designed for the K18 Simplygas unit, called Armonia, which allows integration between the heat pump and an optional auxiliary boiler to be managed as optimally as possible in order to provide the best performance in terms of comfort and energy efficiency.

Specifically, as shown in Figure 1.2 *p. 8* below, various cases are possible:

A. Very low load: active auxiliary boiler in modulation and heat pump off (replacement at a particularly mild outdoor

temperature).

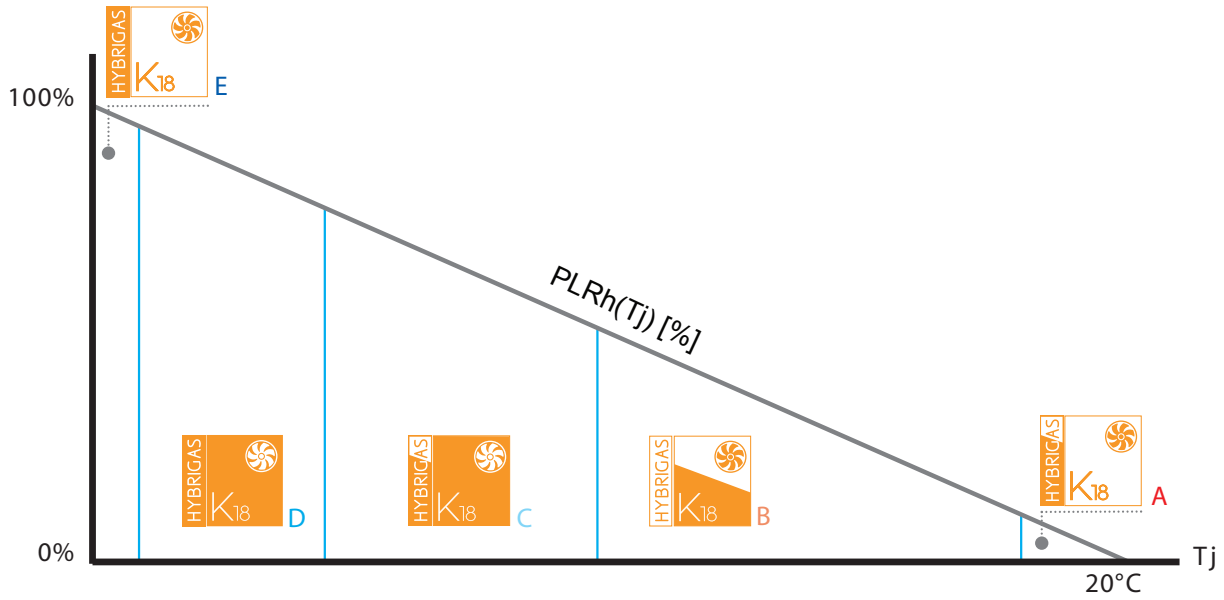
B. Low load: active heat pump in modulation and auxiliary boiler off.

C. Average/high load: active heat pump at full power and active auxiliary boiler in modulation (integration).

D. High load: maximum power for the operating condition to be reached quicker (integration).

E. Very high load: heat pump out of the operating limits and auxiliary boiler that autonomously covers the design load (replacement at low ambient temperature).

Figure 1.2 *Armonia control system diagram*



Tj [°C] outdoor temperature
PLRh(Tj) [%] plant partial load ratio at outdoor temperature Tj
A Heat pump off. Active auxiliary boiler in modulation
B Active heat pump in modulation. Auxiliary boiler off
C Active heat pump at full power. Active auxiliary boiler in modulation
D Active heat pump at full power. Active auxiliary boiler at full power
E Heat pump off. Active auxiliary boiler at full power

In the presence of a minimal thermal demand (scenario A), the minimum power of the heat pump could still be excessive in comparison to the demand. In this case it may be advantageous to use only the auxiliary boiler (replacement mode), if this has adequate modulation capacity.
In the presence of low thermal demand (scenario B), only the heat pump will be active in modulation mode, whereas the auxiliary boiler will be off.
As the thermal demand increases (scenario C), the heat pump reaches full power and, if the thermal load still cannot be fulfilled, it will activate the auxiliary boiler, which (if the specific model used allows it) will run in modulation mode. The heat pump will still remain active and at full power, and therefore the power of the auxiliary boiler will be added to that of the heat pump (integration mode).
When the thermal demand is high (scenario D), for example while the system reaches operating conditions, the heat pump and auxiliary boiler will run at maximum power, reducing the necessary time for the operating conditions to be reached and ensuring the optimal comfort even in harsher environmental conditions.

If the heating system design require the water temperature to be higher than the maximum that can be dispensed by the heat pump, in high thermal demand conditions (scenario E), the auxiliary boiler can be activated as its replacement. In this type of application the maximum thermal load of the building must be at most equal to the power of the auxiliary boiler and not to the sum of the power of the two appliances (replacement mode).

The auxiliary boiler can therefore be operated in four ways (see also Paragraph 5.3.6 *p. 41*):

- ► Inactive (the auxiliary boiler does not intervene in any way).
- ► Emergency (the auxiliary boiler is only activated when there is an alarm on the heat pump module).
- ► Integration (active auxiliary boiler as necessary for integration of the heat output of the heat pump module, scenarios B, C, and D).
- ► Integration and replacement (just like in the integration mode, with the addition that in particular environmental conditions, the heat pump can be deactivated and only the auxiliary boiler operates, scenarios A and E).

1.1.6 DHW production

The K18 Simplygas appliance can autonomously manage the DHW buffer tank charging function if a temperature probe in the buffer tank (available as OSND004 optional) is properly connected and configured.
The DHW production modes available in this scenario are limited to basic functionality. For more comprehensive management of DHW production, the use of the OQLT021 system controller is recommended.
If the unit manages the production of DHW directly, any request contact for the DHW service has the function of switching between two different setpoints of the DHW buffer tank temperature, which can be set by means of appropriate parameters.

In the presence of the OQLT021 system controller, the management of DHW production, with the control of the relevant temperature probe, must be carried out by the controller itself, and not by the K18 Simplygas appliance.

1.1.6.1 DHW production operating modes

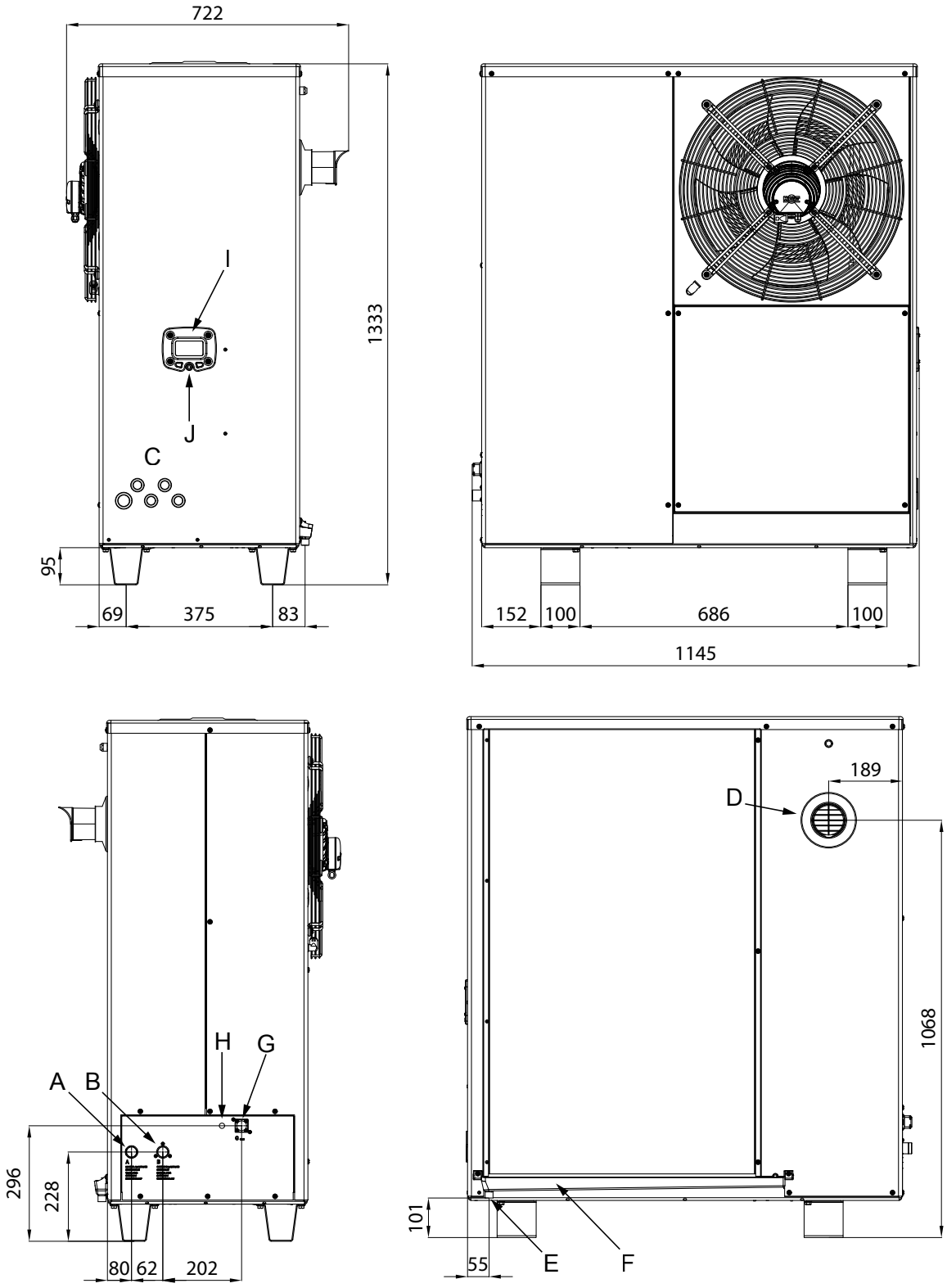
In case DHW production is managed directly by the K18 Simplygas appliance (i.e. in the absence of the OQLT021 system controller) the following operating modes are possible:

1. Fixed comfort setpoint 24 hours/day
2. Fixed comfort setpoint with the possibility to deactivate the DHW request via external request (comfort / OFF)
3. Fixed comfort setpoint or DHW buffer tank antifreeze protection via external request (comfort / antifreeze)
4. Variable setpoint (comfort and reduced) according to programming (with external timer)
5. Fixed setpoint with anti-legionella function (with external timer)

The different operating modes are detailed in Paragraph 5.4.2 *p. 43*.

1.2 DIMENSIONS

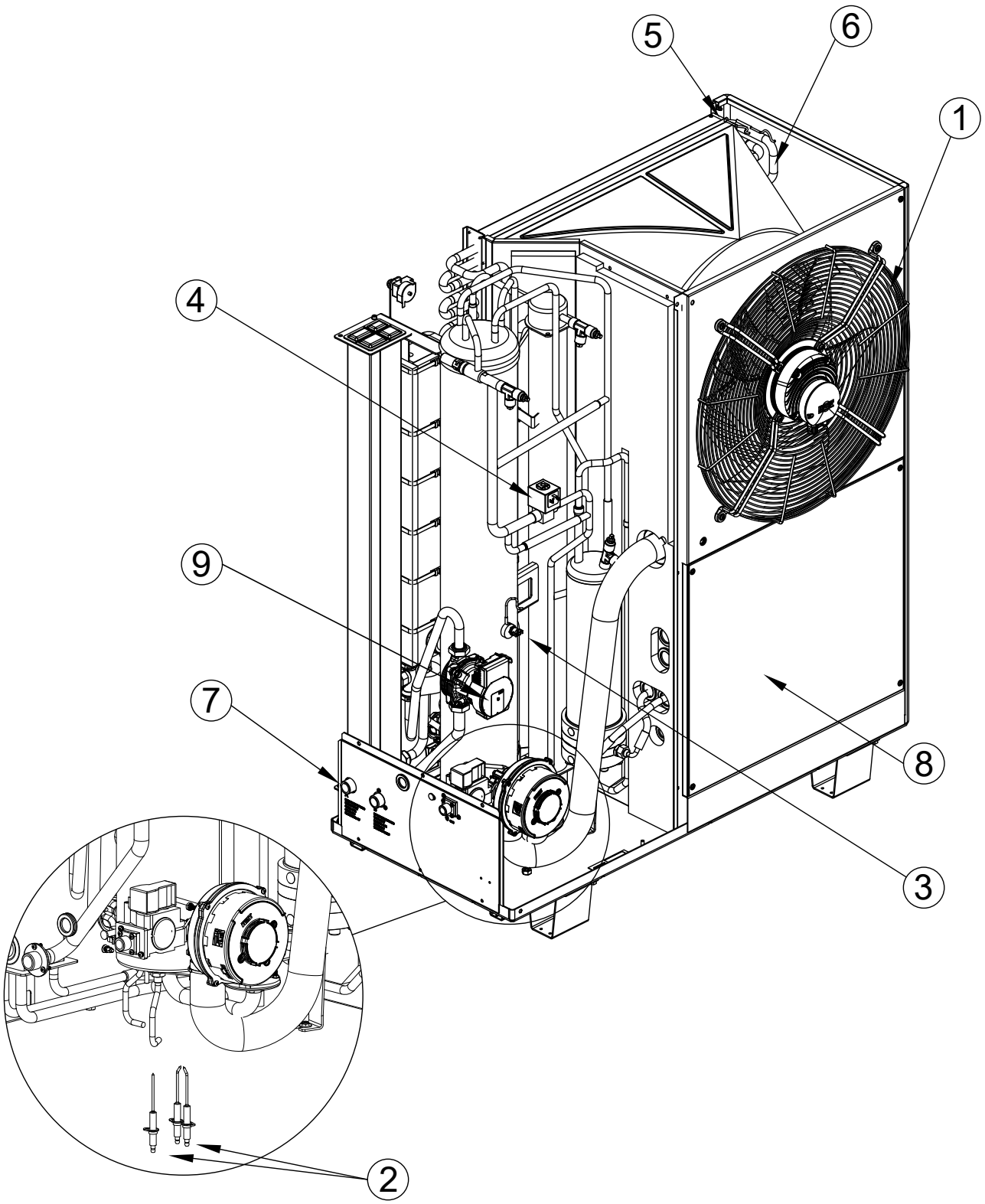
Figure 1.3 *Dimensions K18 Simplygas*



A Water outlet connection Ø 3/4" M
B Water inlet connection Ø 3/4" M
C Electrical connection input
D Flue gas outlet Ø 80 mm
E Flue gas condensate and defrosting water drain Ø 20 mm
F Flue gas condensate and defrosting water discharge conveyor
G Gas connection Ø 1/2" M
H Burner ON green indicator lamp
I Transparent cover, which can be detached to access the user interface keys
J Reset/unlock button

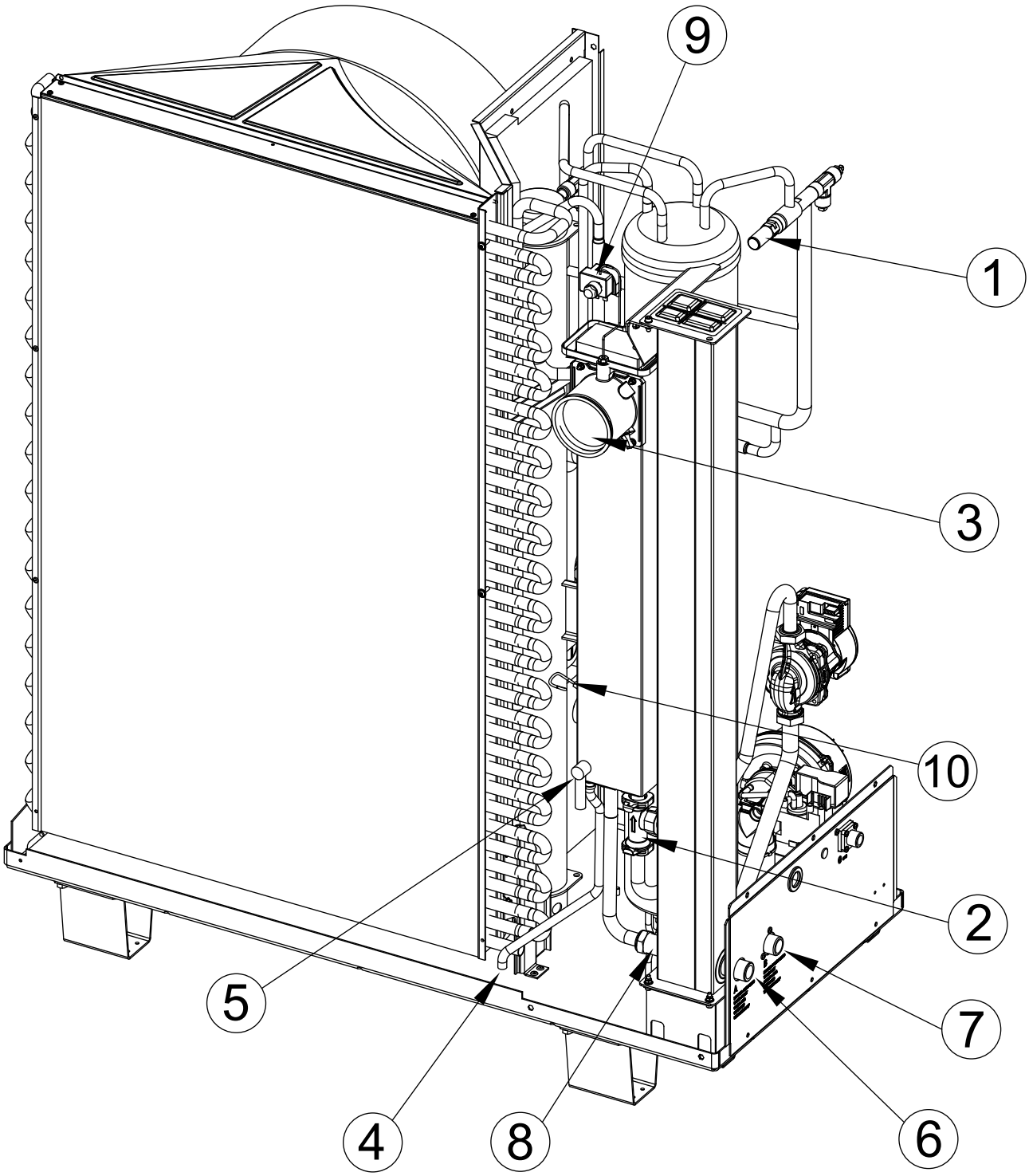
1.3 COMPONENTS

Figure 1.4 *Left front view heat pump module internal components*



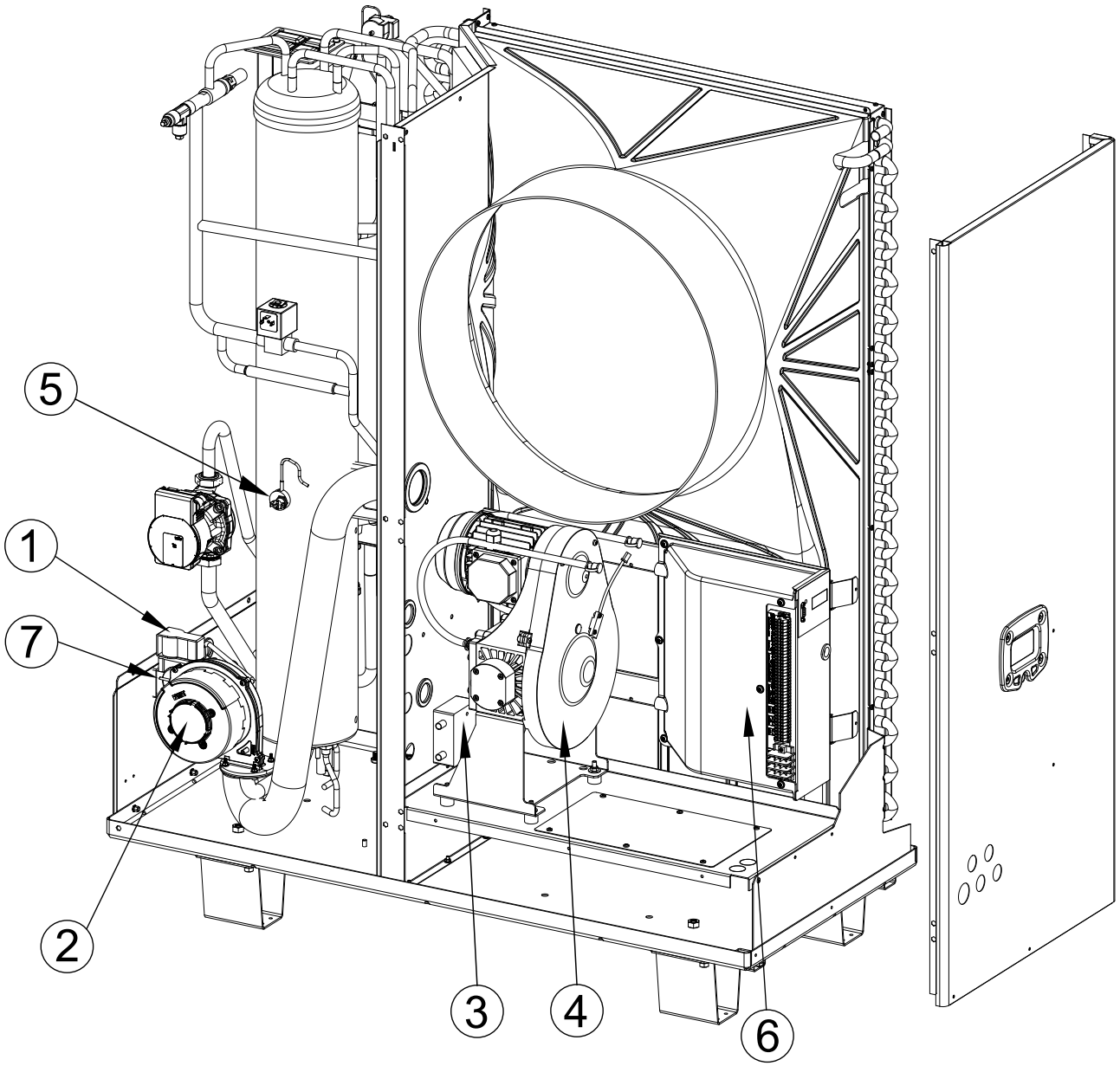
1 Fan
2 Flame sensor / ignition electrodes
3 Limit thermostat
4 Defrosting valve
5 TA outdoor temperature probe
6 Teva evaporator temperature probe
7 Flow temperature probe
8 Components box
9 Circulation pump

Figure 1.5 *Heat pump module internal components rear view*



1	Safety valve	6	Water outlet connection Ø 3/4" M
2	Flowmeter	7	Water inlet connection Ø 3/4" M
3	Heat pump module flue gas exhaust	8	Return temperature probe
4	Condensate discharge	9	120 °C flue gas thermostat
5	Condensate level sensor	10	PT1000 flue exhaust temperature probe

Figure 1.6 *RH front view heat pump module internal components*



1 Gas valve
2 Combustion blower
3 Ignition transformer
4 Oil pump
5 TG generator temperature probe
6 Electrical panel
7 TGV probe

1.4 ELECTRICAL WIRING DIAGRAM

Figure 1.7 *Heat pump module wiring diagram (GHP10)*

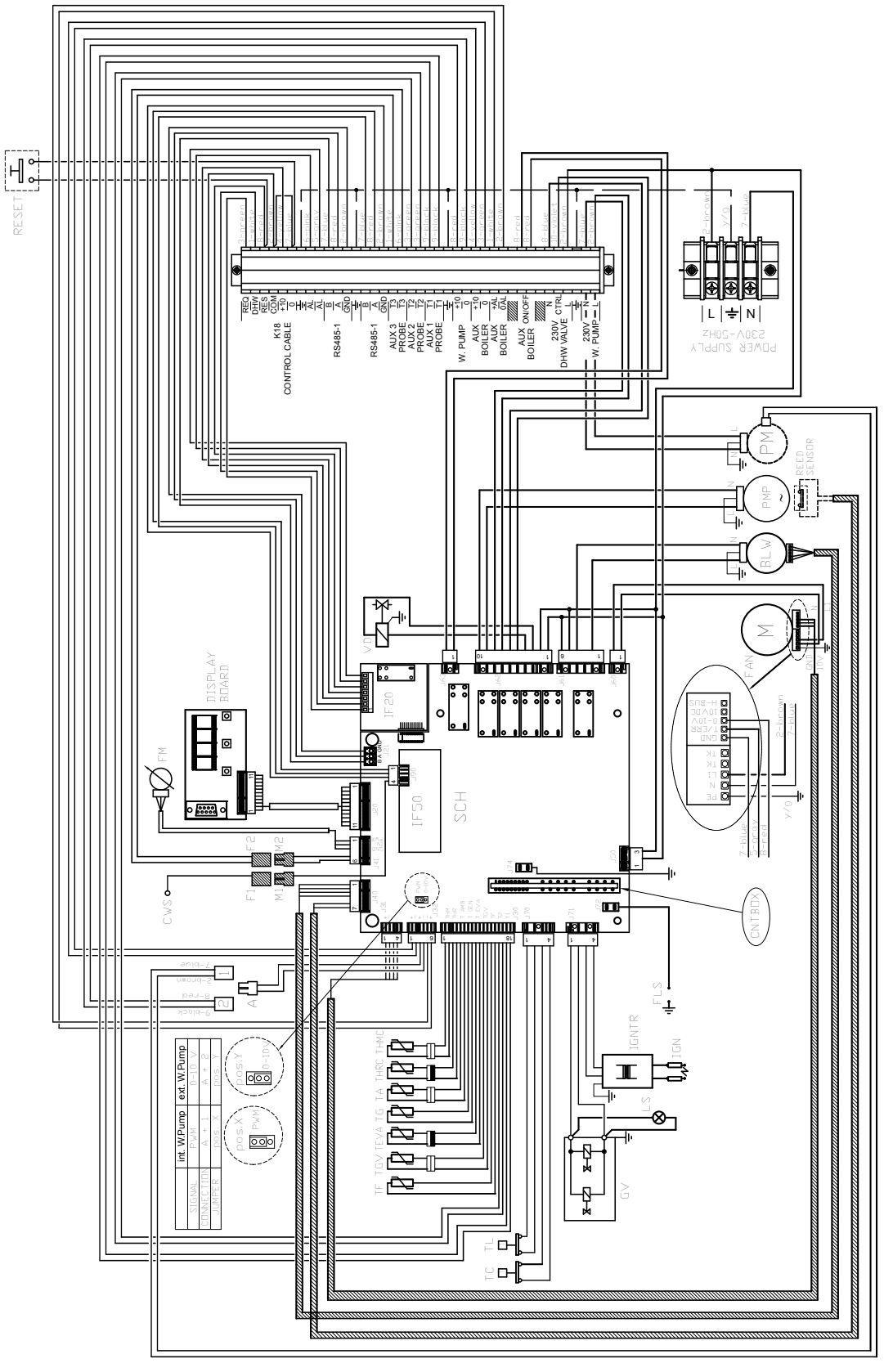
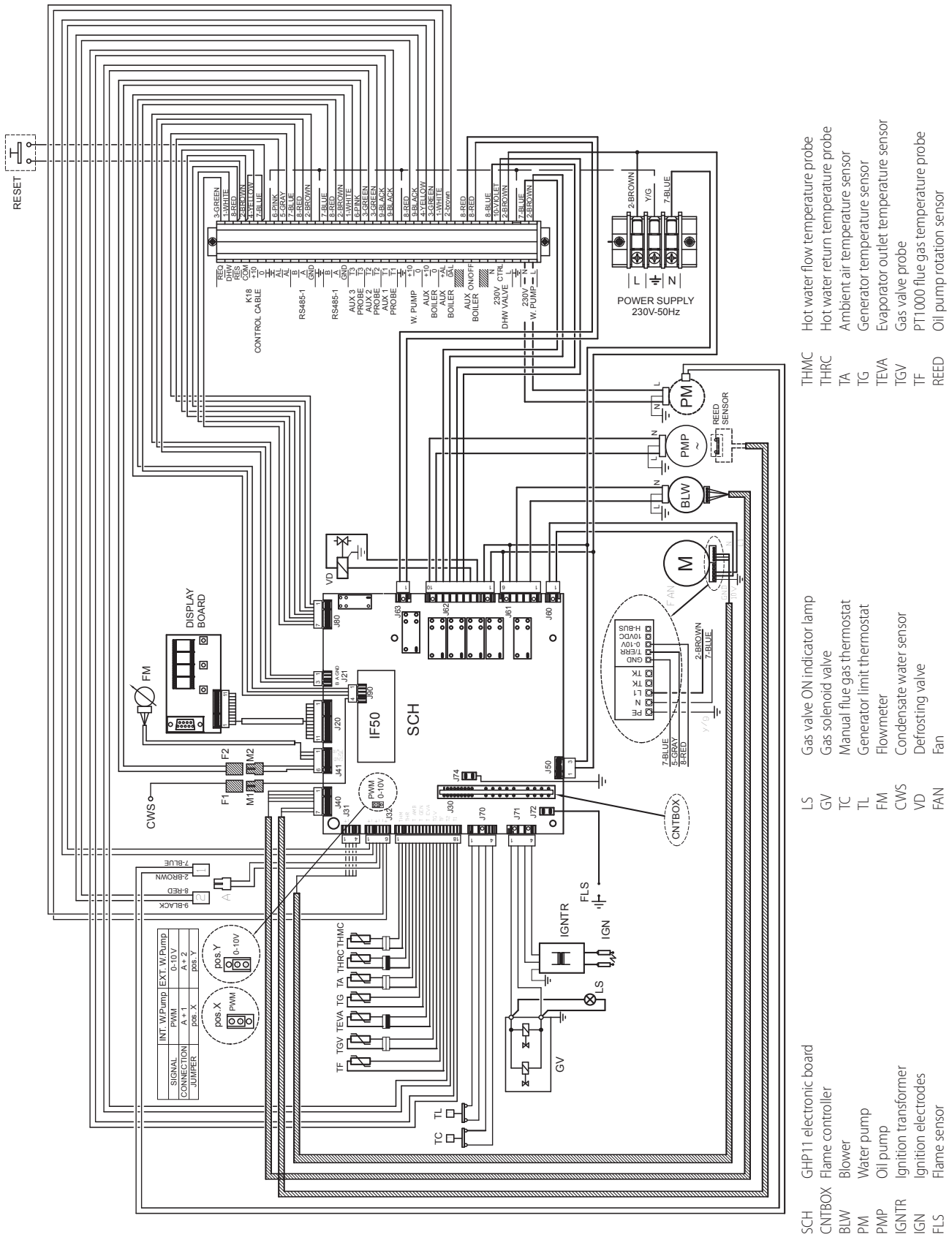


Figure 1.8 *Heat pump module wiring diagram (GHP11)*



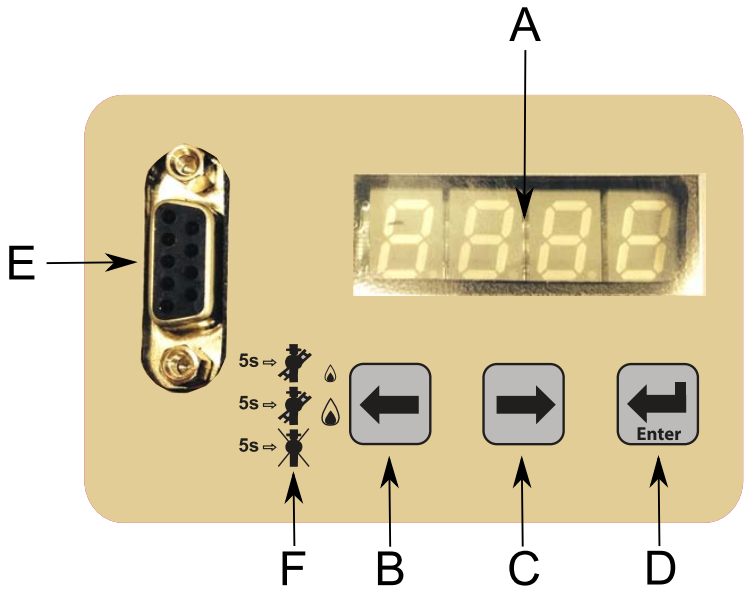
The GHP10 and GHP11 electronic boards presented in the previous diagrams are absolutely identical from a functional point of view.

1.5 ELECTRONIC BOARD

The appliance's electrical panel contains:

► **GHP10/GHP11 electronic board** with microprocessor, it controls the appliance and displays data, messages and operative codes. The appliance is monitored and programmed by interacting with the display and selection keys (Figure 1.9 *p. 16*). The display is accessible from the right side of the unit (detail I Figure 1.3 *p. 10*).

Figure 1.9 *Heat pump module display*



A Display
B Left selection key
C Right selection key
D Enter / Access menu key
E RS232 connector
F Chimney sweep function for heat pump module

1.6 OPERATION MODE

The operating mode of the appliance for space heating is set on modulating by default, that is the thermal power output is adapted to the thermal load.

For any modifications contact the installer or the TAC.

For the DHW production function, if present, the ON/OFF mode is always used.

1.7 CONTROLS

1.7.1 Space heating control device

The appliance may only work if it is connected to a control device, selected from:

1. OQLT021 system controller (optional)
2. OCDS007 ambient chronothermostat (optional)
3. External request

1.7.1.1 OQLT021 system controller (optional)

The OQLT021 controller is able to control one K18 Simplygas unit, one or more heating circuits and DHW production.
The main functions are:

► Control of one K18 Simplygas unit with variable water setpoint according to heating curves and type of DHW function.
► Room comfort control by controlling two heating circuits, of which one optionally of mixed type, or zone valve control; control based on heating curves (one for each circuit) and optionally influence by the installed room unit/s.
► Buffer tank DHW production control (in dedicated preparation tank).
► Data display and parameters setting.
► Hourly programming on a weekly basis on two temperature levels (comfort, reduced).
► Antifreeze protection function.
► Absence periods programming.
► Diagnostics.
► Errors reset.

For further details and diagrams see OQLT021 controller manual.

1.7.1.2 OCDS007 ambient chronothermostat (optional)

The OCDS007 chronothermostat is able to control a single K18 Simplygas unit. In this case the water setpoint is either fixed or based on weather compensation, with a single heating curve which is directly controlled by the K18 Simplygas unit; as such, it can not be modified from the OCDS007 device.
The main functions are:

► Room timer thermostat for hourly programming on a weekly basis on various levels of room temperature.
► Interfacing with the K18 Simplygas unit through voltage-free request contact.
► Reporting on the display of the device of the possible alarm status of the K18 Simplygas unit.

For further information refer to OCDS007 manual.

1.7.1.3 External request

The appliance may also be controlled via generic enable devices (e.g. thermostat, timer, switch, contactor...) fitted with voltage-free NO contact.
This system allows for a control similar or equivalent to that of the system (2), depending on the type of request device used; also, in this case a water setpoint can be used, fixed or calculated according to the climatic curve managed by the unit.
Using a commercially available device it is generally not possible to obtain on the device a reporting of the unit alarm. In case, refer to the Paragraph 4.6 *p. 33* for the connection instructions of a alarm status indicator lamp.

For connection of the selected device to the appliance's

electronic board please refer to Paragraph 4.4 *p. 31*.

1.7.2 DHW production control device

The appliance may only produce DHW if it is connected to a control device, selected from:

1. OQLT021 system controller (optional)
2. Direct control from K18 Simplygas appliance (with DHW buffer tank probe, optional OSND004), without use of external request
3. Direct control from K18 Simplygas appliance (with DHW buffer tank probe, optional OSND004) and use of external request

1.7.2.1 OQLT021 system controller (optional)

The OQLT021 system controller can manage the buffer tank DHW production with the K18 Simplygas appliance in the most comprehensive way.
The main functions for DHW production are:

- ► Selection of the type of DHW function required (continuous production or only in certain time slots).
- ► Programming of DHW request activation time slots.
- ► Programming of DHW buffer tank setpoints.
- ► Programmed antilegionella disinfection management.
- ► Management of the temperature probe in the DHW buffer tank.
- ► Diverter valve management.

1.7.2.2 Direct control from the appliance without use of external request

The production of DHW, without the help of the OQLT021 system controller, will be active 24 hours/day with fixed comfort setpoint. The actual activation of the service will depend on the temperature measured by the temperature probe in the DHW buffer tank. The comfort setpoint will be set to relevant K18 Simplygas appliance parameter.

1.7.2.3 Direct control from the appliance and use of external request

The DHW production management, also in this case carried out without the help of the OQLT021 system controller, can be made more flexible by connecting an external device (typically, and depending on the required function, a timer or a switch) that allows to activate or deactivate the DHW service request or, alternatively, to switch the required setpoint in the DHW buffer tank to two different values. The required setpoint values will be set to the relevant K18 Simplygas appliance parameters.
In the case of using a timer, it will be possible to schedule the DHW production on the timer itself using two different setpoints (comfort / reduced, comfort / antifreeze, or comfort / anti-legionella), or providing for the complete deactivation of the DHW service outside the set time slots.
Through the use of a simple switch, instead, it will not be possible to schedule the DHW service, but two different setpoints or alternatively the activation and deactivation of the DHW production service will be managed manually.

1.8 TECHNICAL DATA

Table 1.2 *K18 Simplygas technical data*

				k18 Simplygas C1
Heating mode				
Seasonal space heating energy efficiency class (ErP)	medium-temperature application (55 °C)		-	A++
	low-temperature application (35 °C)		-	A+
Heat output	Outdoor temperature/Delivery temperature	A7W50	kW	17,6
		A7W35	kW	18,9
GUE efficiency	Outdoor temperature/Delivery temperature	A7W50	%	157
		A7W35	%	169
Heat input	nominal (1013 mbar - 15 °C) (1)		kW	11,4
	real		kW	11,2
Hot water delivery temperature	maximum for heating		°C	65
Hot water return temperature	maximum for heating		°C	55
	minimum temperature in continuous operation		°C	25 (2)
Heating water flow	nominal		l/h	1000
	maximum		l/h	2000
	minimum		l/h	400
Ambient air temperature (dry bulb)	maximum		°C	40
	minimum		°C	-25
DHW mode				
DHW delivery temperature	maximum for DHW		°C	70
DHW inlet temperature	maximum for DHW		°C	60
nominal heat output for DHW at 20 °C ambient			kW	18,9
specific capacity in continuous operation - Δt 30°C			l/min	30,0 (3)
Electrical specifications				
Power supply	voltage		V	230
	type		-	single-phase
	frequency		Hz	50
Electrical power absorption	nominal		kW	0,35

(1) Relative to NCV (net calorific value).
(2) In transient operation, lower temperatures are allowed.
(3) 10 minute peak collection of domestic hot water. The exact value depends on the performance of the DHW buffer tank.
(4) PCI (G20) 34,02 MJ/m^3 (15 °C - 1013 mbar).
(5) PCI (G30/G31) 46,34 MJ/kg (15 °C - 1013 mbar).
(6) It is possible to reduce gas pipe diameter to 3/8", ensuring enough gas pressure to the appliance, considering pressure losses of entire gas supply pipe.
(7) Dimensions including flue gas discharge.
(8) Sound pressure values in free field, with directionality factor 2, obtained from the sound power value in compliance with standard EN ISO 9614. Sound power Lw 65 dB(A) at maximum ventilation, 62 dB(A) at minimum ventilation; sound power values detected in compliance with the intensity measurement methodology set forth by standard EN ISO 9614.

			k18 Simplygas C1
Degree of protection	IP	-	25
Installation data			
Gas consumption	G20 natural gas (nominal)	m^3/h	1,20 (4)
	LPG G30/G31 (nominal)	kg/h	0,87 (5)
Water fitting	type	-	M
	thread	"	3/4
Gas connection	type	-	M
	thread	"	1/2 (6)
Flue gas exhaust	diameter (Ø)	mm	80
	residual head	Pa	70
type of installation		-	B23P, B53P
NO_x emission class		-	5
Dimensions	width	mm	1145
	depth	mm	721 (7)
	height	mm	1333
Weight	in operation	kg	215
sound pressure L_p at 5 metres (max)		dB(A)	43,0 (8)
sound pressure L_p at 5 metres (min)		dB(A)	40,0 (8)
maximum water pressure in operation		bar	4,0
maximum condensation and defrosting water flow rate		l/h	13,5
Water content inside the appliance		l	1
required air flow		m^3/h	4000
Circulating pump data	maximum head	m w.c.	8,0
	residual pressure head at nominal flow rate	m w.c.	4,0
	nominal flow at the maximum available head	l/h	1500
	maximum electrical consumption	W	75
General information			
Cooling fluid	ammonia R717	kg	4,3
	water H_2O	kg	4,4

(1) Relative to NCV (net calorific value).
(2) In transient operation, lower temperatures are allowed.
(3) 10 minute peak collection of domestic hot water. The exact value depends on the performance of the DHW buffer tank.
(4) PCI (G20) 34,02 MJ/m^3 (15 °C - 1013 mbar).
(5) PCI (G30/G31) 46,34 MJ/kg (15 °C - 1013 mbar).
(6) It is possible to reduce gas pipe diameter to 3/8", ensuring enough gas pressure to the appliance, considering pressure losses of entire gas supply pipe.
(7) Dimensions including flue gas discharge.
(8) Sound pressure values in free field, with directionality factor 2, obtained from the sound power value in compliance with standard EN ISO 9614. Sound power Lw 65 dB(A) at maximum ventilation, 62 dB(A) at minimum ventilation; sound power values detected in compliance with the intensity measurement methodology set forth by standard EN ISO 9614.

Table 1.3 *K18 Simplygas PED data*

			k18 Simplygas C1
PED data			
Components under pression	generator	l	14,5
	cooling volume transformer	l	3,0
	absorber/condenser	l	2,2
	cooling absorber solution	l	4,2
	solution pump	l	2,8
test pressure (in air)		bar g	55
maximum pressure of the cooling circuit		bar g	32
filling ratio		kg of NH_3/l	0,161
fluid group		-	group 1°

2 TRANSPORT AND POSITIONING

2.1 WARNINGS

Damage from transport or installation

The manufacturer shall not be liable for any damage during appliance transport and installation.

On-site inspection

- Upon arrival at the site, ensure there is no transport damage on packing, metal panels or finned coil.
- After removing the packing materials, ensure the appliance is intact and complete.

Packing

- Only remove the packing after placing the appliance on site.
- Do not leave parts of the packing within the reach of children (plastic, polystyrene, nails...) since they are potentially dangerous.

Weight

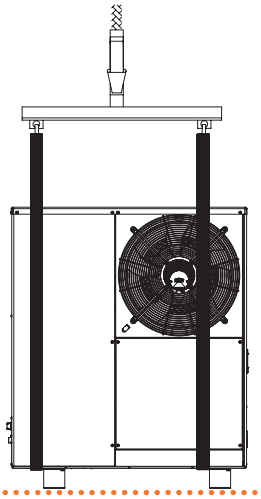
- The lifting equipment must be suitable for the load.
- Do not stand under suspended loads.

2.2 HANDLING

2.2.1 Handling and lifting

- ► Always handle the appliance in its packing, as delivered by the factory.
- ► Use slings to lift the appliance.
- ► Use to lifting beams to avoid damaging the outer panels,finned coil and defrosting water discharge (Figure 2.1 *p. 19*).
- ► It is possible remove defrosting water and flue gas condensate discharge conveyor during handling to avoid damages (reference F Figure 1.3 *p. 10*) using screws; reassemble the discahrge conveyor when handling is ended.
- ► Comply with safety regulations at the installation site.

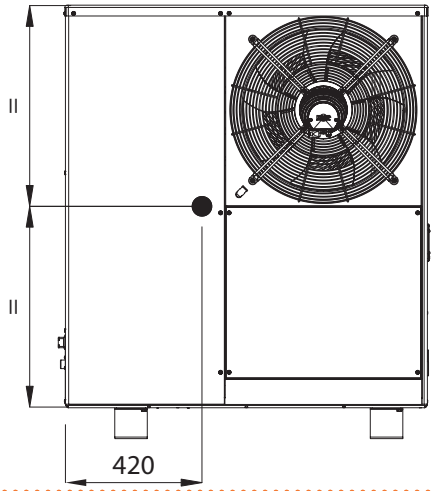
Figure 2.1 *Instruction for lifting*



In the event of handling with forklift or pallet truck, comply with the handling instructions shown on the packing.

Pay attention to the centre of gravity of the unit which is off its centre (Figure 2.2 *p. 19*).

Figure 2.2 *Unit centre of gravity position*



2.3 APPLIANCE POSITIONING

Do not install inside a room

The appliance is type-approved for external installation.

- Do not install inside a room, not even if it has openings.
- In no event start the appliance inside a room.

K18 Simplygas unit ventilation

- The aerothermal appliance requires a large space, ventilated and free from obstacles, to enable smooth flow of air to the finned coil and free air extraction from the fan outlet, with no air recirculation.
- Incorrect ventilation may affect efficiency and cause damage to the appliance.
- The manufacturer shall not be liable for any incorrect choices of the place and setting of installation.

Limiting heat loss

- It is advisable to place the unit near the inlet of the water pipes in the building, minimising the external sections (adequately insulated), in order to avoid unnecessary heat loss.

2.3.1 Where to install the appliance

- ► The appliance may be installed at ground level, on a terrace or on a roof, compatibly with its dimensions and weight.
- ► It must be installed outside buildings, in an area of natural air circulation, outside the dripping path of drainpipes or similar. It does not require protection from weathering.
- ► No obstruction or overhanging structure (e.g. protruding roofs, canopies, balconies, ledges, trees, etc.) must interfere either with the air flow reaching the finned coil and leaving the front part of the appliance or with the fumes exhaust.
- ► The appliance's flue gas exhaust must not be immediately close to openings or air intakes of buildings, and must comply with safety and environmental regulations.
- ► Do not install near the exhaust of flues, chimneys or hot polluted air. In order to work correctly, the appliance needs clean air.

2.3.2 Defrosting water drainage

In winter, it is normal for frost to form on the finned coil and for the appliance to perform defrosting cycles.

To prevent overflowing and damages provide for a drainage system connected to water discharge (reference E Figure 1.3 *p. 10*).

2.3.3 Acoustic issues

Pre-emptively assess the appliance's sound effect in connection to the site, taking into account that building corners, enclosed courtyards, restricted spaces may amplify the acoustic impact due to the reverberation phenomenon.

2.4 MINIMUM CLEARANCE DISTANCES

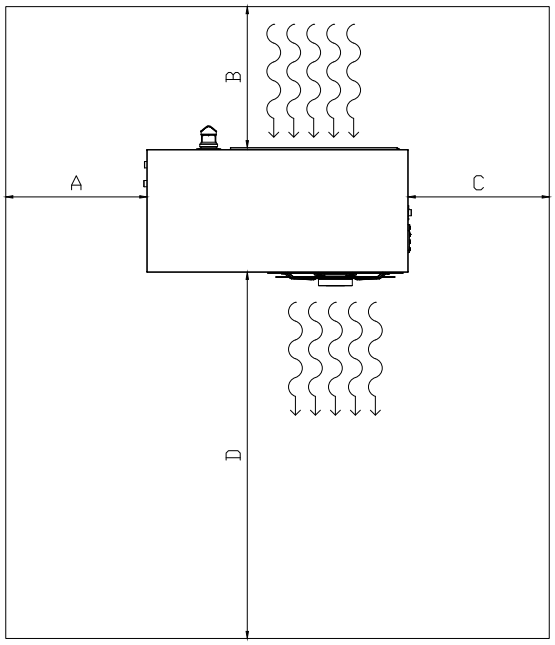
2.4.1 Distances from combustible or flammable materials

► Keep the appliance away from combustible or flammable materials or components, in compliance with applicable regulations.

2.4.2 Clearances around the appliance

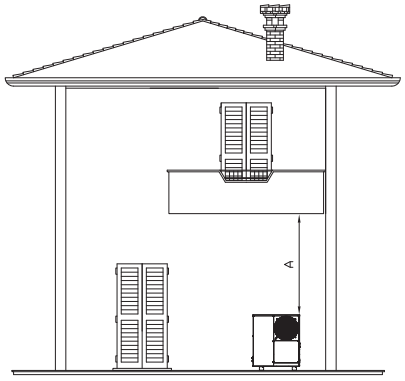
The minimum clearance distances shown in Figure 2.3 *p. 20* (bar any stricter regulations) are required for safety, operation and maintenance.
An open area of at least 2.5 m must be guaranteed above the appliance so as to allow free air circulation, as shown in Figure 2.4 *p. 20*.

Figure 2.3 *K18 Simplygas minimum clearance distances*



A 600 mm
B 600 mm *
C 600 mm
D 1500 mm
* This distance can be reduced to 300 mm if the flue gas discharge is vertical.

Figure 2.4 *Minimum open area above the units*



A 2,5 m min

2.5 MOUNTING BASE

2.5.1 Mounting base constructive features

► Place the appliance on a level flat surface made of fireproof material and able to withstand its weight.

In order to simplify maintenance operations even in case of adverse weather conditions (snow, heavy rain ...) it is suggested to install the unit at a height of about 300 mm from the ground.

2.5.2 Installation at ground level

► Failing a horizontal supporting base, make a flat and level concrete base, at least 100-150 mm larger than the appliance size per side.

2.5.3 Installation on terrace or roof

► The structure of the building must support the total weight of the appliance and the supporting base.
► If necessary, provide a maintenance walkway around the appliance.

2.5.4 Anti vibration mountings

Although the appliance's vibrations are minimal, resonance phenomena might occur in roof or terrace installations.
► Use vibration damper supports (available as optional features).
► Also provide anti-vibration joints between the appliance and water and gas pipes.

3 HEATING ENGINEER

3.1 WARNINGS

General warnings

Read the warnings in Chapter III.1 *p. 4*, providing important information on regulations and on safety.

Compliance with installation standards

Installation must comply with applicable regulations in force, based on the installation Country and site, in matters of safety, design, implementation and maintenance of:

- heating systems
- cooling systems
- gas systems
- flue gas exhaust
- flue gas condensate discharge

Installation must also comply with the manufacturer's provisions.

3.2 HYDRAULIC SYSTEM

3.2.1 Primary and secondary heating circuit

The K18 Simplygas appliance can operate in plants with primary circuit only, or in plants with primary and secondary circuits with hydraulic separation: in the first case the water pump managed by the K18 Simplygas unit ensures water circulation also for the users; in the second case water circulation in heating circuits is ensured by dedicated water pumps.

With regard to the generation part, the layout must be set up as shown in Figure 3.1 *p. 22* for the K18 Simplygas C1 appliance for space heating only, or as in Figure 3.2 *p. 23* for the K18 Simplygas C1 appliance for heating and DHW production (with basic DHW functionality). See Figure 3.3 *p. 24* for the K18 Simplygas C1 appliance for heating, DHW production with advanced DHW functionality and management of one or more heating circuits.

With regard to the heating distribution circuits, the solutions described in Figures 3.4 *p. 24*, 3.5 *p. 25*, 3.6 *p. 25* are possible.

3.2.2 Constant ot variable water flow

The K18 Simplygas unit may operate with constant or variable water flow, according to electronic board settings (Paragraph 5.3.4 *p. 40*).
System and components must be designed and installed consistently.

3.2.3 Minimum water content

High thermal inertia is conducive to efficient appliance operation. Very short ON/OFF cycles are to be avoided.
A buffer tank (input on the top and output on the bottom) is not strictly required but suggested in systems with low water content in the primary circuit to ensure a minimum load during the periods of medium to low thermal demand. It is recommended in systems where the system water flow can be significantly reduced, and therefore, in the presence of:

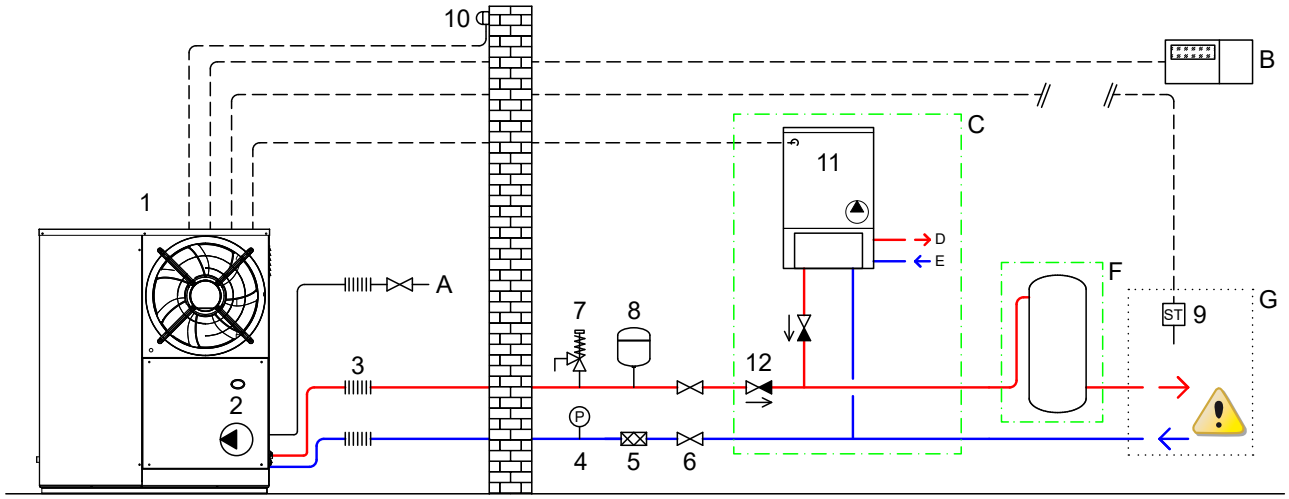
- ► 2-way zone valves
- ► thermostatic valves on radiators
- ► heating circuits with several zones

A capacity of 80/100 liters is usually adequate.

3.2.4 Hydraulic diagrams

3.2.4.1 K18 Simplygas hydraulic diagram for space heating only

Figure 3.1 *K18 Simplygas C1 for space heating only, with optional auxiliary boiler*

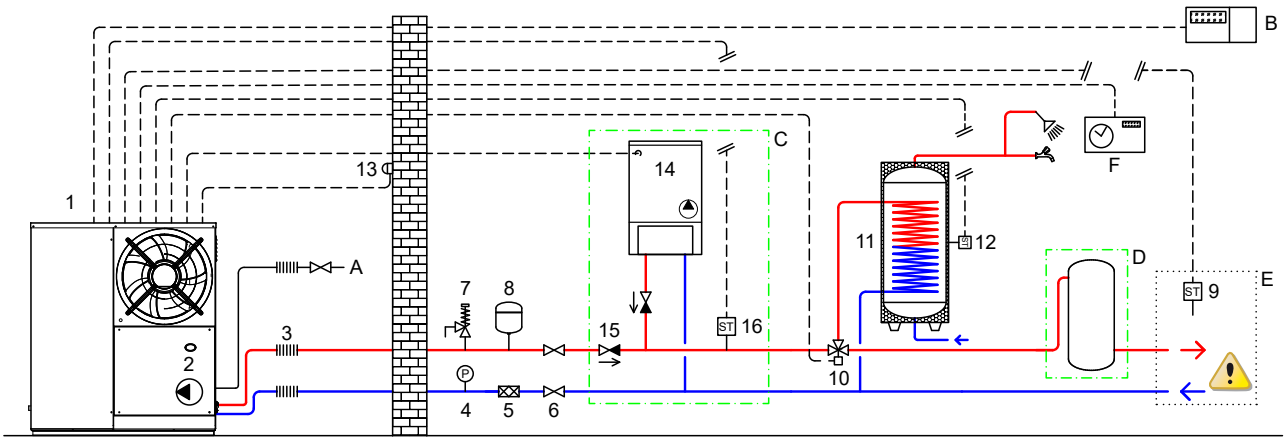


1 k18 Simplygas C1 heat pump
2 Enclosed modulating water pump, 4,0 m w.c. available head
3 Anti-vibration connection
4 Pressure gauge
5 Sludge filter
6 Shut-off valve
7 3 bar safety valve
8 Expansion tank
9 GHP immersion temperature probe (standard) to be installed on heating circuit (see Paragraph 3.2.4.4 *p. 24*)
10 Outdoor temperature probe (available as OSND007 optional)
11 Auxiliary boiler (optional)
12 Check valve (to be installed only in the presence of an auxiliary boiler)
A Gas connection
B Ambient chronothermostat (available as OCDS007 optional)
C Auxiliary boiler group (optional)
D Optional domestic hot water connection
E Optional domestic cold water connection
F Buffer tank group min 100 l (optional)
G Heating distribution circuit, to be carried out as described in Paragraph 3.2.4.4 *p. 24*

The components enclosed in dotted rectangles are optional.

3.2.4.2 K18 Simplygas hydraulic diagram for space heating and DHW production (basic functionality)

Figure 3.2 *K18 Simplygas C1 for space heating and DHW production (basic functionality), with optional auxiliary boiler*



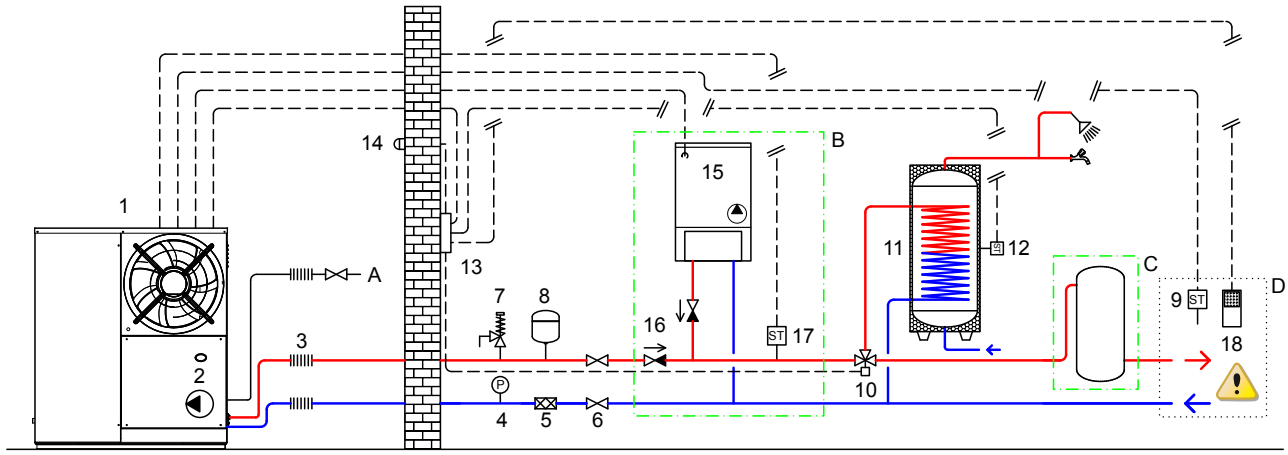
1 k18 Simplygas C1 heat pump
2 Enclosed modulating water pump, 4,0 m w.c. available head
3 Anti-vibration connection
4 Pressure gauge
5 Sludge filter
6 Shut-off valve
7 3 bar safety valve
8 Expansion tank
9 GHP immersion temperature probe (standard) to be installed on heating circuit (see Paragraph 3.2.4.4 *p. 24*)
10 3-way diverter valve for heating/DHW management (available as OVLV007 optional)
11 DHW buffer tank, 200 or 300 liter, 3 or 4 sqm coil (available as optional OSRB012 or OSRB004)
12 Immersion temperature probe GHP'' (available as OSND004 optional)
13 Outdoor temperature probe (available as OSND007 optional)
14 Auxiliary boiler (optional)
15 Check valve (to be installed only in the presence of an auxiliary boiler)
16 GHP' immersion temperature probe (only in the presence of an auxiliary boiler, available as OSND004 optional)
A Gas connection
B Ambient chronothermostat (available as OCDS007 optional)
C Auxiliary boiler group (optional)
D Buffer tank group min 100 l (optional)
E Heating distribution circuit, to be carried out as described in Paragraph 3.2.4.4 *p. 24*
F Daily/weekly timer for DHW service

The components enclosed in dotted rectangles are optional.

In case the system requires all three GHP, GHP' and GHP'' probes, the outdoor temperature probe cannot be installed. In this case the regulation based on climate curve uses the value supplied by the outdoor temperature probe installed on board the appliance.

3.2.4.3 K18 Simplygas hydraulic diagram with OQLT021 system controller

Figure 3.3 *K18 Simplygas C1 with OQLT021 system controller, with optional auxiliary boiler*



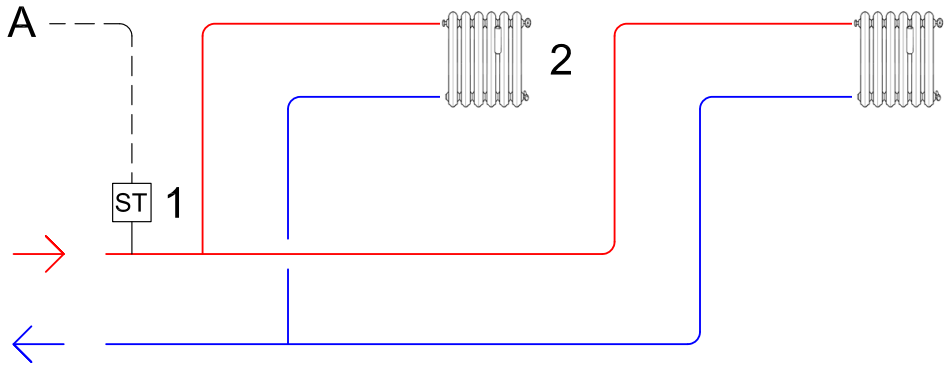
1 K18 Simplygas C1 heat pump
2 Enclosed modulating water pump, 4,0 m w.c. available head
3 Anti-vibration connection
4 Pressure gauge
5 Sludge filter
6 Shut-off valve
7 3 bar safety valve
8 Expansion tank
9 GHP immersion temperature probe (standard) to be installed on heating circuit (see Paragraph 3.2.4.4 *p. 24*)
10 3-way diverter valve for heating/DHW management (available as OVLV007 optional)
11 DHW buffer tank, 200 or 300 liter, 3 or 4 sqm coil (available as optional OSRB012 or OSRB004)
12 Immersion temperature probe (available as OSND004 optional)
13 System controller (required optional OQLT021)
14 Outdoor temperature probe (standard with OQLT021)
15 Auxiliary boiler (optional)
16 Check valve (to be installed only in the presence of an auxiliary boiler)
17 GHP' immersion temperature probe (only in the presence of an auxiliary boiler, available as OSND004 optional)
18 Advanced room unit (optional supplied as per standard with OQLT021, to be placed, preferably, in a heated room)
A Gas connection
B Auxiliary boiler group (optional)
C Buffer tank group min 100 l (optional)
D Heating distribution circuit, to be carried out as described in Paragraph 3.2.4.4 *p. 24*

The components enclosed in dotted rectangles are optional.

3.2.4.4 Heating distribution

Direct heating distribution with single zone (system with primary water circuit only)

Figure 3.4 *Heating distribution 01 - direct*



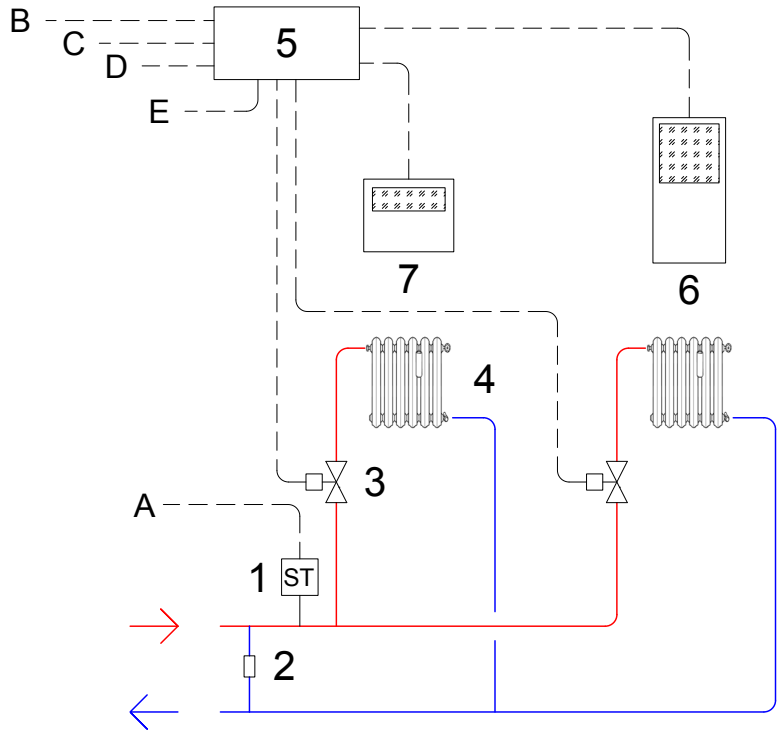
1 GHP immersion temperature probe (standard)
2 Radiator
A Connection to K18 unit (GHP plant water temperature probe)

Water flow

Water circulation must always be guaranteed, e.g. to enable the unit's antifreeze function to be carried out correctly. Leave a radiator without a valve (thermostatic or manual), or create a outlet/inlet bypass equipped with overpressure valve set to open only when all the radiators are closed, as shown in Figure 3.5 *p. 25*.

Heating distribution with two zones controlled by 2-way valves (system with primary water circuit only)

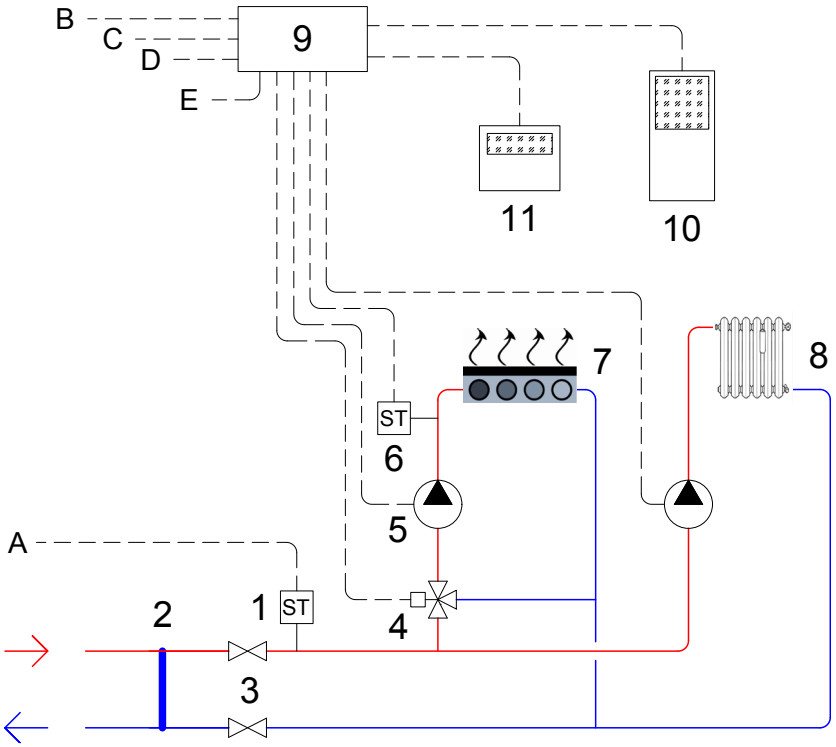
Figure 3.5 *Heating distribution 02 - system controller with two 2-way zone valves*



1 GHP immersion temperature probe (standard)
2 Bypass section with overpressure valve calibrated to open only when both valves (3) are closed
3 2-way valve
4 Radiator
5 System controller (required optional OQLT021)
6 Advanced room unit (standard)
7 Advanced room unit (available as optional ODSP050) or basic room unit (available as optional ODSP004)
A Connection to K18 unit (GHP plant water temperature probe)
B Connection to K18 unit (heating service request). See system controller manual
C Outdoor temperature probe connection
D DHW buffer tank immersion temperature probe connection (if present)
E DHW/space heating 3-way diverter valve connection (if present)

Heating distribution with up to two heating circuits, one of which is optionally mixed and one not mixed (system with primary and secondary water circuits)

Figure 3.6 *Heating distribution 03 - system controller with a mixed heating circuit and a direct one*



1 GHP immersion temperature probe (standard)
2 Decoupling of primary/secondary circuits (large cross-section pipe with T-connections or a hydraulic separator)
3 Shut-off valve
4 Zone mixing valve
5 Zone circulating pump (available as OPMP009/OPMP004 optional)
6 Immersion temperature probe (available as OSND004 optional)
7 Underfloor heating panel
8 Radiator
9 System controller (required optional OQLT021)
10 Advanced room unit (standard)
11 Advanced room unit (available as optional ODSP050) or basic room unit (available as optional ODSP004)
A Connection to K18 unit (GHP plant water temperature probe)
B Connection to K18 unit (heating service request). See system controller manual
C Outdoor temperature probe connection
D DHW buffer tank immersion temperature probe connection (if present)
E DHW/space heating 3-way diverter valve connection (if present)

3.3 HYDRAULIC CONNECTIONS

3.3.1 Plumbing fittings

on the left, at the bottom, connection plate (Figure 1.3 *p. 10*).
- ► A (= out) 3/4" M - WATER OUTLET (m = outlet to the system)
- ► B (= in) 3/4" M - WATER INLET (r = return from the system)

3.3.2 Hydraulic pipes, materials and features

- ► Use pipes for heating/cooling systems, protected from weathering, insulated for thermal dispersion.

Pipe cleaning

- ■ Before connecting the appliance,accurately wash the water and gas piping and any other system component, removing any residue.

3.3.3 Minimum components of heating plumbing circuit

Always provide, near the appliance:
- ► on water piping, both output and input
  - ■ 2 antivibration joints on water fittings
  - ■ 2 isolation ball valves
- ► on the inlet water piping
  - ■ 1 separator filter (preferably magnetic)
  - ■ 1 pressure gauge
- ► on the output water piping
  - ■ 1 safety valve (3 bar)
  - ■ 1 adequately sized expansion tank

The K18 Simplygas appliance is equipped with remote temperature probe (GHP), to be installed by the installer on the delivery pipe to the plant, after optional primary/secondary separation or buffer tank (reference 1 Figure 3.4 *p. 24*, 3.5 *p. 25*, 3.6 *p. 25*).

Furthermore, in case the plant has the function of DHW production and includes an auxiliary boiler, it is necessary to install a second temperature probe (GHP') upstream of the three-way diverter valve, as shown in Figure 3.2 *p. 23* (detail 16) and 3.3 *p. 24* (detail 17).

Insert GHP remote water temperature probe and, if required, GHP' temperature probe, in dedicated thermowells immersed in water flow, using thermal paste to ensure proper heating transfer.

Refer to Paragraph 4.8 *p. 34* for the electrical connection of the water temperature probes.

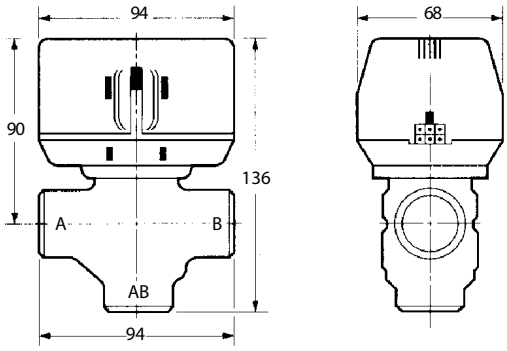
3.3.4 Minimum components of DHW production water circuit

The production of DHW is done by diverting the hot water flow produced by the K18 Simplygas appliance and then the components listed below are added, only if DHW production is required, to the components required for the space heating circuit (Paragraph 3.3.3 *p. 26*):
- ► 1 DHW buffer tank, 200 or 300 liter, 3 or 4 sqm coil (available as optional OSRB012 or OSRB004)
- ► 1 3-way diverter valve (available as OVLV007 optional)
- ► 1 temperature probe in the DHW buffer tank (available as OSND004 optional)

It is recommended, in case DHW production takes place in the absence of the OQLT021 system controller, to install also a timer to manage the DHW service request to the K18 Simplygas appliance.

3.3.5 OVLV007 diverter valve (optional)

Figure 3.7 *OVLV007 diverter valve dimensions*



Consider the following for the hydraulic connection:
- ► AB = common
- ► A = DHW circuit
- ► B = space heating circuit

3.4 WATER CIRCULATION PUMP

K18 Simplygas appliances are equipped with a variable flow circulation pump. For pump data, refer to Table 1.2 *p. 17*.

3.5 ANTIFREEZE FUNCTION

3.5.1 Active antifreeze self-protection

The appliance is equipped with an active antifreeze self-protection system to prevent freezing. The antifreeze function (activated by default) automatically starts the primary circulation pump and, if required, the burner too, when the outside temperature approaches zero.

Electrical and gas continuity

The active antifreeze self-protection is only effective if the power and gas supplies are assured. Otherwise, antifreeze liquid might be required.

3.5.2 Antifreeze protection of DHW buffer tank

The DHW buffer tank, in case the DHW production is entrusted only to the K18 Simplygas appliance, without the OQLT021 system controller, is protected from frost only by properly setting the board parameters.

3.6 WINTER KIT (OKBT015)

The use of the optional OKBT015 winter kit protects the condensate drain tray from freezing.
It consists of a heating cable, an antifreeze thermostat, and the relative electrical wiring.

3.7 ANTIFREEZE LIQUID

Precautions with glycol

The manufacturer disclaims any liability for any damage

caused by improper glycol use.

- Always check product suitability and its expiry date with the glycol supplier. Periodically check the product's preservation state.
- Do not use car-grade antifreeze liquid (without inhibitors), nor zinc-coated piping and fittings (incompatible with glycol).
- Glycol modifies the physical properties of water (density, viscosity, specific heat...). Size the piping, circulation pump and thermal generators accordingly.
- With automatic system water filling, a periodic check of the glycol content is required.

With high glycol percentage (> 20...30%)

If the glycol percentage is ≥30% (for ethylene glycol) or ≥20% (for propylene glycol) the TAC must be alerted before first start-up.

When producing DHW by DHW buffer tank, use propylene glycol only.

3.7.1 Type of antifreeze glycol

Inhibited type glycol is recommended to prevent oxidation phenomena.

3.7.2 Glycol effects

The Table 3.1 *p. 27* shows, indicatively, the effects of using a glycol depending on its %.

Table 3.1 *Technical data for filling the hydraulic circuit*

Glycol %	Water-glycol mixture freezing temperature	Percentage of increase in pressure drops	Loss of efficiency of unit
10	-3 °C	-	-
15	-5 °C	6,0%	0,5%
20	-8 °C	8,0%	1,0%
25	-12 °C	10,0%	2,0%
30	-15 °C	12,0%	2,5%
35	-20 °C	14,0%	3,0%
40	-25 °C	16,0%	4,0%

3.8 SYSTEM WATER QUALITY

Responsibility of the user/operator/installer

The installer, operator and user must assure system water quality (Table 3.2 *p. 27*). Failure to comply with the manufacturer's guidelines may affect operation, integrity and life of the appliance, voiding the warranty.

3.8.1 System water characteristics

Free chlorine or water hardness may damage the appliance.
Adhere to the chemical-physical parameters in Table 3.2 *p. 27* and the regulations on water treatment for residential and industrial heating systems.

Table 3.2 *Chemical and physical parameters of water*

Chemical and physical parameters of water in heating/cooling systems		
Parameter	**Measurement unit**	**Required value**
pH	/	> 7 (1)
Chlorides	mg/l	< 125 (2)
Total hardness ($CaCO_3$)	°f	< 15
	°d	< 8,4
Iron	mg/kg	< 0,5 (3)
Copper	mg/kg	< 0,1 (3)
Aluminium	mg/l	< 1
Langelier's index	/	0-0,4
Harmful substances		
Free chlorine	mg/l	< 0,2 (3)
Fluorides	mg/l	< 1
Sulphides		ABSENT

1 With aluminium or light alloys radiators, pH must also be lower than 8 (in compliance with applicable rules)
2 Value referred to the maximum water temperature of 80 °C
3 In compliance with applicable rules

3.8.2 Water topping up

The chemical-physical properties of the system's water may alter over time, resulting in poor operation or excessive topping up.

► Ensure there are no leaks in the installation.
► Periodically check the chemical-physical parameters of the water, particularly in case of automatic topping up.

Chemical conditioning and washing

Water treatment/conditioning or system washing carried out carelessly may result in risks for the appliance, the system, the environment and health.

- Contact specialised firms or professionals for water treatment or system washing.
- Check compatibility of treatment or washing products with operating conditions.
- Do not use aggressive substances for stainless steel or copper.
- Do not leave washing residues.
- Always refer to the requirements of the standards and existing regulations.

3.9 SYSTEM FILLING

After completing all water, electrical and gas connections:

1. Pressurise (at least 1,5 bar) and vent the hydraulic circuit.
2. Make sure that the unit is energized.
3. Send an operating request to the unit for a few seconds. The circulating pump will be immediately activated.
4. Remove the request before the burner is activated. The circulating pump will continue to circulate the water for the post-circulation time.
5. Check and clean the filter on the inlet pipe.
6. Repeat items 1, 2 and 3 until the pressure has stabilised (at least 1,5 bar).

3.10 FUEL GAS SUPPLY

3.10.1 Gas connection

► 1/2" M
on the left, at the bottom, connection plate (Figure 1.3 *p. 10*).

It is possible to reduce gas pipe diameter to 3/8", ensuring enough gas pressure to the appliance (see Table 3.3 *p. 28*), considering pressure losses of entire gas supply pipe.

► Install an anti-vibration connection between the appliance and the gas piping.

3.10.2 Mandatory shut-off valve

► Provide a gas shut-off valve (manual) on the gas supply line, next to the appliance, to isolate it when required.

► Perform connection in compliance with applicable regulations.

3.10.3 Gas pipes sizing

The gas pipes must not cause excessive pressure drops and, consequently, insufficient gas pressure for the appliance.

3.10.4 Supply gas pressure

This appliance is equipped for a maximum gas supply pressure of 50 mbar.

The appliance's gas supply pressure, both static and dynamic, must comply with Table 3.3 *p. 28*, with tolerance ± 15%.

Non compliant gas pressure (Table 3.3 *p. 28*) may damage the appliance and be hazardous.

Table 3.3 *Network gas pressure*

		Gas supply pressure			
Product category	**Countries of destination**	**G20** [mbar]	**G25** [mbar]	**G30** [mbar]	**G31** [mbar]
$II_{2H3B/P}$	AL, BG, CY, CZ, DK, EE, FI, GR, HR, IT, LT, MK, NO, RO, SE, SI, SK, TR	20		30	30
	AT, CH	20		50	50
II_{2H3P}	AL, BG, CZ, ES, GB, HR, IE, IT, LT, MK, PT, SI, SK, TR	20			37
	RO	20			30
$II_{2ELL3B/P}$	DE	20	20	50	50
II_{2Esi3P}	FR	20	25		37
$II_{2HS3B/P}$	HU	25		30	30
II_{2E3P}	LU	20			50
$II_{2L3B/P}$	NL		25	50	50
$II_{2E3B/P}$	PL	20		37	37
$I_{2E(S)}$	BE	20	25		
I_{3P}	BE				37
	IS				30
I_{2H}	LV	20			
$I_{3B/P}$	MT			30	30
I_{3B}				30	

3.10.5 Vertical pipes and condensate

► Vertical gas pipes must be fitted with siphon and discharge of the condensate that may form inside the pipe.
► If necessary, insulate the piping.

3.10.6 LPG pressure reducers

With LPG the following must be installed:
► A first stage pressure reducer, close to the liquid gas tank.
► A second stage pressure reducer, close to the appliance.

3.11 COMBUSTION PRODUCTS EXHAUST

Compliance with standards

The appliance is approved for connection to a combustion products exhaust duct for the types shown in Table 1.2 *p. 17*.

3.11.1 Flue gas exhaust connection

► Ø 80 mm (with gasket), on the rear, at the top (Figure 1.3 *p. 10*).
The appliance is supplied with flue gas exhaust kit, to be fitted by the installer.

How to install the flue gas exhaust kit

1. Remove the cover applied to the flue gas exhaust.
2. Fit the terminal onto the collar on the flue gas exhaust.

The cover prevents water and/or foreign bodies entering the appliance before the exhaust kit is installed. The cover should thus be removed only when actually installing the exhaust kit on the appliance.

3.11.2 Possible flue

The fumes exhaust may be wall-mounted, but it can also be easily conveyed over the ridge of the roof because the residual head allows the ducts to be extended by some tens meters, if the local regulations require this.
Table 3.4 *p. 29* below shows the characteristics of the combustion products of the K18 Simplygas unit.

Table 3.4 *K18 Simplygas flue gas exhaust characteristics*

				K18 Simplygas
Installation data				
CO_2 percentage in fumes	Nominal heat input	G20	%	9,0 (1)
		G30	%	10,5 (2)
		G31	%	10,0 (3)
Flue temperature	Nominal heat input	G20	°C	60,0
		G30	°C	60,0
		G31	°C	60,0
Fumes flow rate	Nominal heat input	G20	kg/h	19
		G30	kg/h	19
		G31	kg/h	21
type of installation			-	B23P, B53P
Flue gas exhaust	diameter (Ø)		mm	80
	residual head		Pa	70

(1) 8,8 ÷ 9,2.
(2) 10,3 ÷ 10,7.
(3) 9,8 ÷ 10,2.

- ► The flue must be designed, sized, tested and constructed by a skilled firm, with materials and components complying with the regulations in force in the country of installation.
- ► Always provide a socket for flue gas analysis, in an accessible position.

In case of flue gas discharge to the roof, use a Tee at the base of the vertical pipe, with proper condensate drain, provided with siphon, to be connected to a suitable discharge manifold.

3.12 FLUE GAS CONDENSATE DISCHARGE

The K18 Simplygas unit is a condensing appliance and therefore produces condensation water from combustion flue gases.

Condensate acidity and exhaust regulations

The flue gas condensate contains aggressive acid substances. Refer to applicable regulations in force for condensate exhaust and disposal.

- ■ If required, install an acidity neutraliser of adequate capacity.

Do not use gutters to discharge the condensate.

Do not discharge the fume condensate in gutters, due to the risk of materials corrosion and ice formation.

3.12.1 Flue gas condensate connection

The connection for flue gas condensate discharge is located on the rear of the appliance (reference E in Figure 1.3 *p. 10*).

- ► The condensate discharge pipe must be connected to a suitable discharge manifold.
- ► The junction between the pipe and the manifold must remain visible.
- ► If the condensate drain is routed indoor, a suitable siphon needs to be installed on the pipe.
- ► The connection of the discharge to the sewerage system must be made at atmospheric pressure, i.e. by dripping into a siphoned container connected to the sewerage system.

3.12.2 Flue gas condensate discharge manifold

To make the condensate drain manifolds:

- ► Size the ducts for maximum capacity (maximum condensation and defrosting water flow rate) (Table 1.2 *p. 17*).
- ► Use plastic materials resistant to acidity pH 3-5.
- ► Provide for min. 1% slope, i.e. 1 cm for each m of the length (otherwise a booster pump is required).
- ► Prevent freezing.
- ► Dilute, if possible, with domestic waste water (e.g. bathrooms, washing machines, dish washers...), basic and neutralising.

In the first few minutes of unit operation, that is in conditions of low condensate production, imperceptible steam or combustion gas might escape the condensate exhaust, which are not harmful either for machine operation or for the materials used for condensate exhaust.

3.13 DEFROSTING WATER DRAINAGE

Defrosting

In winter, frost may form on the finned coil and the appliance performs defrosting cycles.

The defrosting water drain is located below the finned coil itself (see reference E in Figure 1.3 *p. 10*).
Prevent the condensate and defrost water drain from freezing by using a heating cable (available as OKBT015 optional) to protect the conveyor tray and installed piping.

4 ELECTRICAL INSTALLER

4.1 WARNINGS

General warnings

Read the warnings in Chapter III *p. 4*, providing important information on regulations and on safety.

Compliance with installation standards

Installation must comply with applicable regulations in force, based on the installation Country and site, in matters of safety, design, implementation and maintenance of electrical systems.

Installation must also comply with the manufacturer's provisions.

Live components

- ■ After placing the appliance in the final position, and prior to making electrical connections, ensure not to work on live components.

Earthing

- ■ The appliance must be connected to an effective earthing system, installed in compliance with regulations in

force.
- It is forbidden to use gas pipes as earthing.

Cable segregation

Keep power cables physically separate from signal ones.

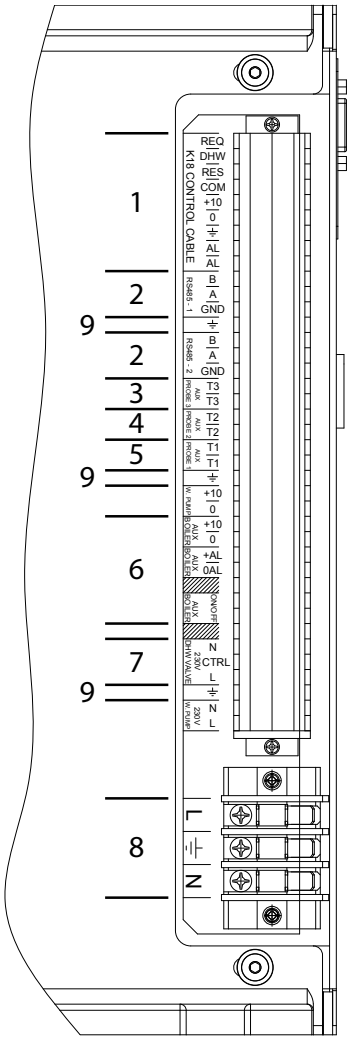
Do not use the power supply switch to turn the appliance on/off

- Never use the external isolation switch (GS) to turn the appliance on and off, since it may be damaged in the long run (occasional blackouts are tolerated).
- To turn the appliance on and off, exclusively use the suitably provided control device.

4.2 ELECTRICAL SYSTEMS

Electrical connections provide:
A. Power supply (Paragraph 4.3 *p. 31*).
B. Space heating control system (Paragraph 4.4 *p. 31*).
C. DHW production control system (Paragraph 4.4.2 *p. 32*).
D. Diverter valve for DHW production (Paragraph 4.5 *p. 32*).
E. Alarm indicator lamp (if there is no optional system controller, Paragraph 4.6 *p. 33*).
F. Unit error reset remote (if there is no optional system controller, Paragraph 4.7 *p. 34*).
G. Temperature probes (if there is no system controller: Paragraph 4.8 *p. 34*; if there is a system controller: installation manual of the system controller).
H. Auxiliary boiler (if present, Paragraph 4.9 *p. 35*).
I. Optional OKBT015 winter kit (Paragraph 4.10 *p. 36*).

Figure 4.1 *Terminal block for electrical connections of K18 unit*



1 Control system connection (see Paragraph 4.4 *p. 31*)
2 Modbus connection to RS485 port for optional monitoring
3 GHP'' or EXT.T temperature probe connection (see Paragraph 4.8 *p. 34*)
4 GHP' or EXT.T temperature probe connection (see Paragraph 4.8 *p. 34*)
5 GHP temperature sensor connection (see Paragraph 4.8 *p. 34*)
6 Connections of optional auxiliary boiler (see Paragraph 4.9 *p. 35*)
7 Possible connection of three-way diverter valve for DHW (see Paragraph 4.5 *p. 32*)
8 Power supply connection (see Paragraph 4.3 *p. 31*)
9 Earth connections for signal cable shielding

How to make connections

All electrical connections must be made in the connection terminal block located near the electrical panel:
1. Ensure the appliance is not live.
2. Remove the appliance's lower front panel (placed under the fan).
3. Remove the cap of the hole for electrical connection (see reference C Figure 1.3 *p. 10*) and fit a suitable cable gland in order to:
   - Properly protect the cable insulation from abrasion.
   - Properly protect cables against mechanical stresses on the wiring terminals and liquid penetration (at least the protection index IP 25 declared for the unit must be guaranteed).

The unused holes for cables passage must remain

covered by caps.

4. Insert cables through cable gland.
5. Identify the appropriate connection terminals.
6. Make the connections.
7. Replace the lower front panel.

4.3 ELECTRICAL POWER SUPPLY

4.3.1 Power supply line

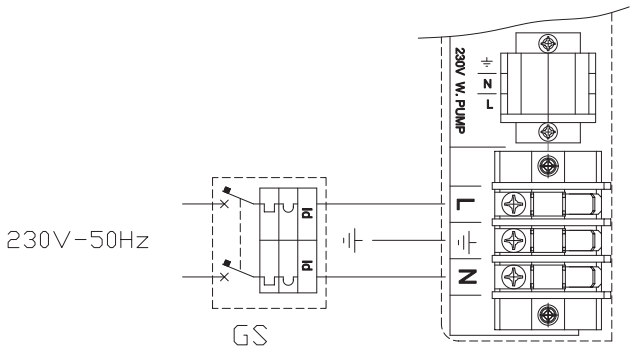
Provide (by the installer) a protected single phase line (230 V 1-N 50 Hz) with:
- ► 1 three-pole cable type FG7(O)R 3Gx1,5
- ► 1 4 A magnetothermic breaker with differential protection

The switches must also provide disconnector capability, with min contact opening 4 mm.

How to connect the power supply

To connect the three-pole power supply cable (Figure 4.2 *p. 31*):
1. Access the connection terminal block according to Procedure 4.2 *p. 30*.
2. Connect the three wires to the terminal block (TER) as shown in Figure 4.2 *p. 31*.
3. Provide the earth lead-in wire longer than live ones (last to be torn in the event of accidental pulling).

Figure 4.2 *Appliance connection to the mains power supply (230V 1N - 50 Hz)*



L Phase
N Neutral
Components NOT SUPPLIED:
GS 4A magnetothermic breaker with differential protection

4.4 CONTROL SYSTEM

4.4.1 Space heating control systems

Three separate control systems are provided, each with specific features, components and diagrams:
- ► OQLT021 system controller (optional)
- ► OCDS007 ambient chronothermostat (optional)
- ► External request

4.4.1.1 OQLT021 system controller (optional)

See also Paragraph 1.7.1.1 *p. 16*.

How to connect the OQLT021 system controller

Connection of OQLT021 system controller is made on the wiring terminal block located in the electrical panel inside the appliance.
1. Access the electrical board of the appliance according to the Procedure 4.2 *p. 30*.
2. Refer to the OQLT021 controller Installation manual for the actual wiring instructions.

4.4.1.2 OCDS007 ambient chronothermostat (optional)

See also Paragraph 1.7.1.2 *p. 16*.

How to connect the OCDS007 ambient chronothermostat

Connection of OCDS007 ambient chronothermostat is made on the wiring terminal block located in the electrical panel inside the appliance.
1. Access the electrical board of the appliance according to the Procedure 4.2 *p. 30*.
2. Perform connections as shown in the diagram in Figure 4.3 *p. 32* and in Figure 4.4 *p. 32*.
3. Use shielded cable 2x0,75 mm² (or 4x0,75 mm² if the alarm indication signal is included), connecting the shield to one of the ground terminals provided on the appliance electrical panel.
4. The connection cable must be kept separate from mains voltage cables.

The cable may not be longer than 30 metres.

4.4.1.3 External request

See also Paragraph 1.7.1.3 *p. 16*.
It is required to arrange:
- ► Enable device (e.g. thermostat, timer, switch, ...) fitted with a voltage-free NO contact.

How to connect the external request

Connection of external request is effected on the terminal block located in the electrical panel inside the unit.
1. Access the electrical board of the appliance according to the Procedure 4.2 *p. 30*.
2. Connect the voltage-free contact of the external device, through two conductor wires, to terminals COM and REQ (respectively: common and heating request) of the internal terminal block (Figure 4.5 *p. 32*).
3. Use shielded cable 2x0,75 mm², connecting the shield to one of the ground terminals provided on the appliance electrical panel.
4. The connection cable must be kept separate from mains voltage cables.

The signal is SELV (Safety Extra Low Voltage). The voltage-free contact of the external device that gives the request must have double or reinforced insulation with respect to line voltage parts.

The cable may not be longer than 30 metres.

Figure 4.3 *Connection of request signal to OCDS007 chronothermostat*

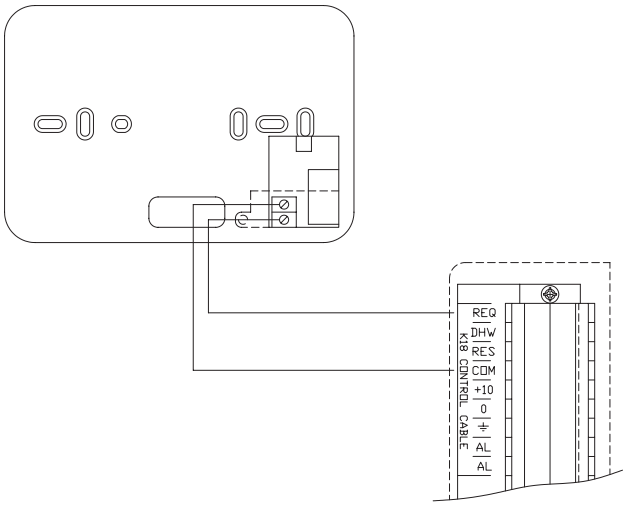


Figure 4.4 *Connection of alarm indication signal to OCDS007 chronothermostat*

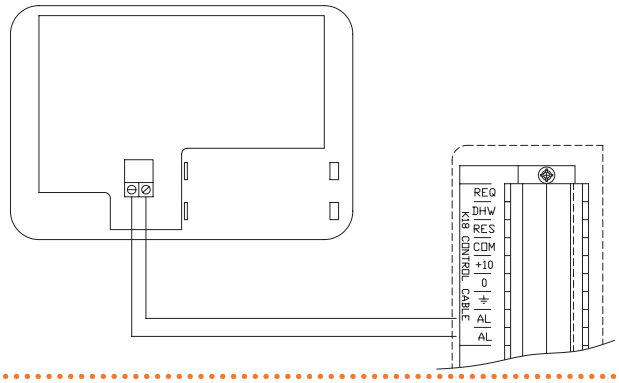
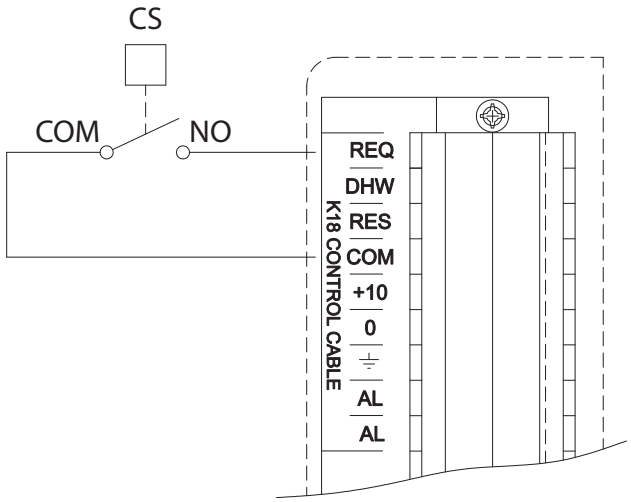


Figure 4.5 *External heating request connection*



COM Common
REQ Heating request

Components NOT SUPPLIED:
CS External request

4.4.2 DHW production control systems

4.4.2.1 OQLT021 system controller (optional)

See Paragraph 4.4.1.1 *p. 31*.

4.4.2.2 External request

See also Paragraph 1.7.2.3 *p. 17*.

It is required to arrange:

► Enable device (e.g. thermostat, timer, switch, ...) fitted with a voltage-free NO contact.

How to connect the external request

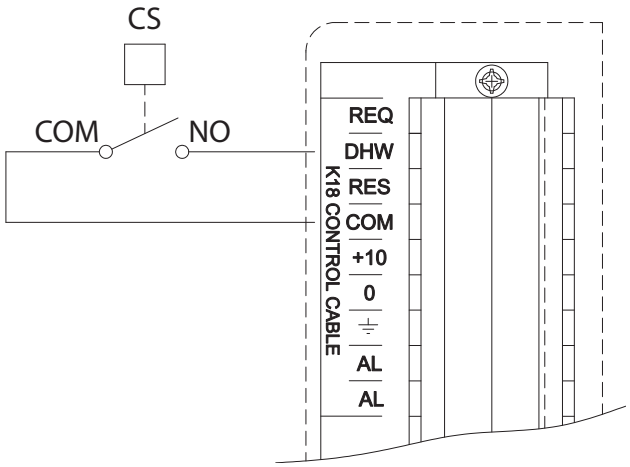
Connection of external request is effected on the terminal block located in the electrical panel inside the unit.

1. Access the electrical board of the appliance according to the Procedure 4.2 *p. 30*.
2. Connect the voltage-free contact of the external device, through two conductor wires, to terminals COM and DHW (respectively: common and DHW request selector) of the internal terminal block (Figure 4.6 *p. 32*).
3. Use shielded cable 2x0,75 mm^2, connecting the shield to one of the ground terminals provided on the appliance electrical panel.
4. The connection cable must be kept separate from mains voltage cables.

The signal is SELV (Safety Extra Low Voltage). The voltage-free contact of the external device that gives the request must have double or reinforced insulation with respect to line voltage parts.

The cable may not be longer than 30 metres.

Figure 4.6 *DHW external request connection*



COM Common
DHW DHW request selector

Components NOT SUPPLIED:
CS External request

4.5 DIVERTER VALVE FOR DHW PRODUCTION

This paragraph is not applicable in case of use of OQLT021 system controller. If such a controller is used, follow the instructions for connecting the diverter valve in the relevant installation manual.

The DHW diverter valve is required if DHW production service is required.
The DHW diverter valve must be of the type with always present

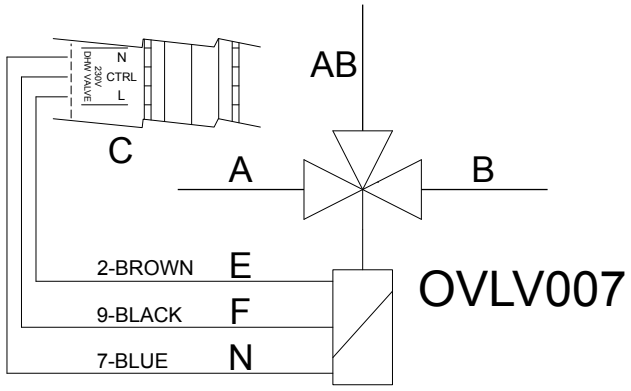
power supply and position controlled by the phase signal (230 VAC).
The use of the DHW diverter valve proposed as OVLV007 optional simplifies the installation as the wiring is immediately recognizable by the wire's colour (Figure 4.7 *p. 33*).

How to connect the OVLV007 diverter valve

Connection of the diverter valve is made on the wiring terminal block located in the electrical panel inside the appliance.

1. Access the electrical board of the appliance according to the Procedure 4.2 *p. 30*.
2. Connect the control contacts of the valve through three conductor wires to the terminals "230V DHW VALVE" of the internal terminal block (Figure 4.7 *p. 33*). The brown wire is the fixed phase supply, the blue wire is the neutral and the black wire is the control phase signal.
3. The control phase signal must be present when the valve is in the DHW position, while it must be absent when the valve is in the space heating position.

Figure 4.7 *Connection of OVLV007 DHW diverter valve*



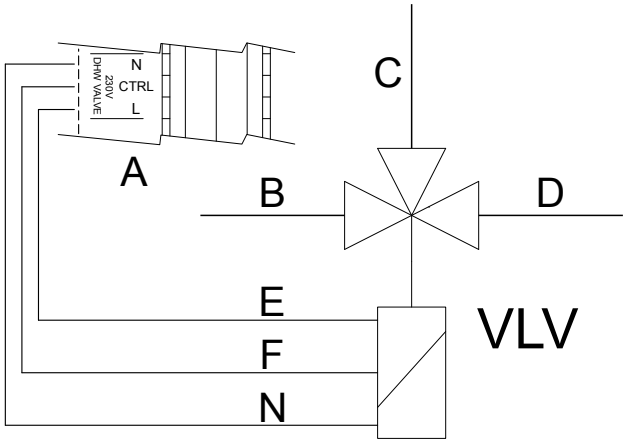
AB Common (delivery from K18)
A DHW coil outlet
B Heating outlet
C K18 unit terminal block detail
E Fixed phase power (brown wire)
F Signal (phase present in DHW service, black wire)
N Neutral (blue wire)
OVLV007 DHW diverter valve (optional OVLV007)
2 Brown
7 Blue
9 Black

How to connect the generic diverter valve

Connection of the diverter valve is made on the wiring terminal block located in the electrical panel inside the appliance.

1. Access the electrical board of the appliance according to the Procedure 4.2 *p. 30*.
2. Connect the control contacts of the valve through three conductor wires to the terminals "230V DHW VALVE" of the internal terminal block (Figure 4.8 *p. 33*). The DHW diverter valve must be of the type with always present power supply and position controlled by the phase signal (230 VAC).
3. The control phase signal must be present when the valve is in the DHW position, while it must be absent when the valve is in the space heating position.

Figure 4.8 *Connection of generic DHW diverter valve*



A K18 unit terminal block detail
B Flow from K18
C DHW coil outlet
D Heating outlet
E Fixed phase power
F Signal (phase present in DHW service)
N Neutral (blue wire)
VLV Generic DHW diverter valve

4.6 ALARM INDICATOR LAMP

This paragraph is not applicable in case of use of OQLT021 system controller or OCDS007 chronothermostat.

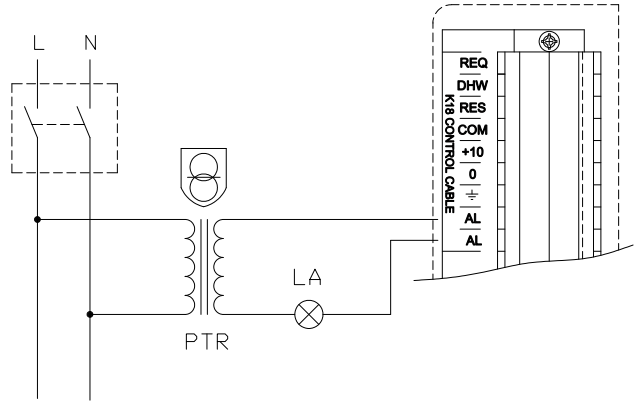
It is possible to connect a lamp indicating an appliance's alarm to the electrical panel inside the appliance.
To connect the alarm indicator lamp, follow the instructions below.

Figure 4.9 *p. 34*.

1. Access the connection terminal block according to Procedure 4.2 *p. 30*.
2. The cable required to connect the lamp must be shielded 2x0,75 mm^2.
3. Cut a suitable length of cable.
4. Connect the cable to terminals AL and AL.
5. The connection cable must be kept separate from mains voltage cables.

The cable may not be longer than 30 metres.

Figure 4.9 *Connection of alarm indicator lamp*



L Phase
N Neutral
Components NOT SUPPLIED:
LA General alarm indicator lamp
PTR Safety transformer with secondary voltage ≤ 24V (according to IEC EN 61558-2-6)

The AL lamp switched on indicates an appliance's alarm. To know the type of alarm, read through the sight glass (reference I Figure 1.3 *p. 10*), the operating code on the display of the electronic board and refer to Table 8.2 *p. 51*.

4.7 REMOTE THE BOARD ERROR RESET

This paragraph is not applicable in case of use of OQLT021 system controller.

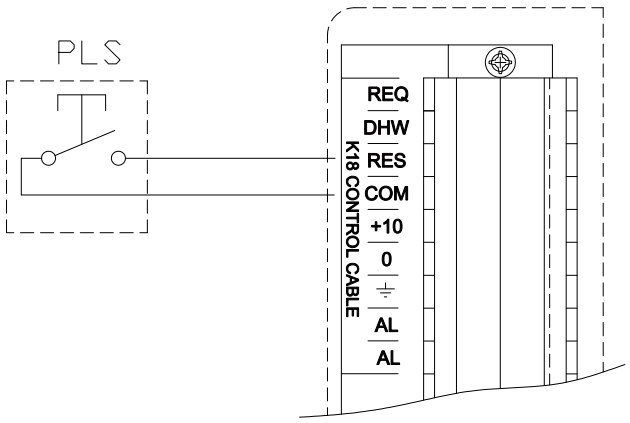
The board error reset may be remoted by connecting a dedicated button to the terminal block in the electrical panel inside the appliance.
Connect the button as instructed below.

Figure 4.10 *p. 34*

1. Access the connection terminal block according to Procedure 4.2 *p. 30*.
2. The cable required to connect the reset button must be shielded 2x0,75 mm².
3. Cut a suitable length of cable.
4. Connect the cable to terminals COM and RES.
5. The connection cable must be kept separate from mains voltage cables.

The cable may not be longer than 30 metres.

Figure 4.10 *Connection of board error reset*



COM Common
RES Reset errors
Components NOT SUPPLIED:
PLS Release button

4.8 TEMPERATURE PROBES

The following instructions to electrical connection of temperature probes do not apply if the OQLT021 system controller is used. In the presence of this controller, follow the connection instructions of the temperature probes provided in the relevant installation manual.

It is possible to connect up to three temperature probes, AUX PROBE 1 and/or AUX PROBE 2 and/or AUX PROBE 3 to control specific functions, described in Paragraph 5.3.5 *p. 40*.

Use shielded cable for connecting temperature probes

2x0,5 mm² up to 40 m
2x0,75 mm² up to 60 m
2x1,0 mm² up to 80 m
2x1,5 mm² up to 120 m
Connect the shield to a ground terminal on the K18 unit's terminal block.

4.8.1 GHP immersion temperature probe

The GHP probe supplied must be installed on the heating distribution circuit, downstream of any primary/secondary decoupling or the optional buffer tank (see detail 1 Figures 3.4 *p. 24*, 3.5 *p. 25*, 3.6 *p. 25*). This probe must be connected to the AUX PROBE 1 input as shown in Figure 4.11 *p. 35*.

4.8.2 Outdoor temperature probe

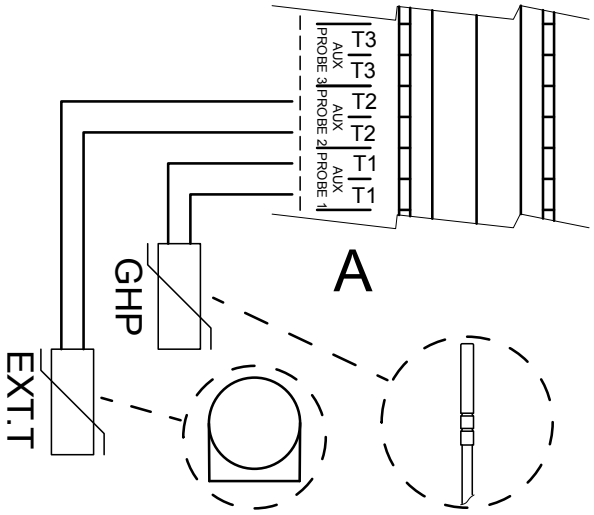
The outdoor temperature probe (available as OSND007 optional) must be connected to the AUX PROBE 2 input as shown in Figure 4.11 *p. 35* if the K18 appliance only manages the space heating service or as shown in Figure 4.13 *p. 35* if the K18 appliance directly manages the DHW production service, but without an auxiliary boiler.
With reference to Paragraph 1.7 *p. 16*, this probe is recommended for applications in which control type (2) or (3) is used together with adjustment based on climatic curve.
However, if the system requires all three GHP, GHP' and GHP'' probes (see also Paragraph 4.8.3 *p. 35* below), the outdoor temperature probe cannot be installed (Figure 4.12 *p. 35*). In

this case the regulation based on climate curve uses the value provided by the outdoor temperature probe mounted onboard the appliance.

4.8.3 DHW storage (GHP'') and DHW charging circuit (GHP') temperature probes

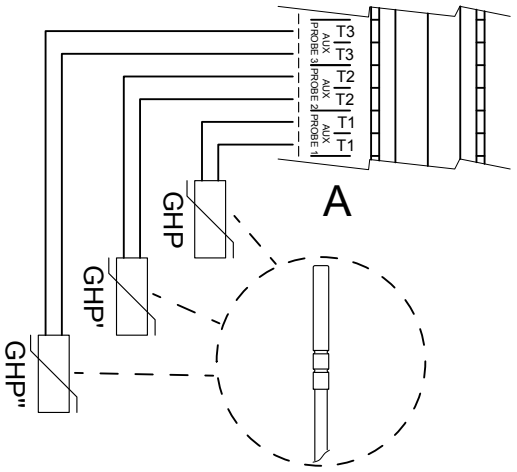
The DHW buffer tank temperature probe (GHP'') is required if the DHW production service, directly managed by the K18 Simplygas appliance, is required.
The probe must be fixed in a dedicated thermowell, with a length suitable to result immersed in water mass, using thermal paste to ensure a good heat transfer.
In case one of the optional DHW buffer tanks is used (code OSRB012 or OSRB004), it is recommended to use the thermowell just above mid height for the GHP'' probe.
Even in case other water buffer tanks are used, place probe GHP'' in an intermediate position, possibly just above mid-height.
Again in the case of DHW production service directly managed by the K18 Simplygas appliance, if there is also an auxiliary boiler, a temperature probe (GHP') must also be installed on the DHW charging circuit, immediately upstream of the diverter valve (detail 16 in Figure 3.2 *p. 23*).
The GHP'' probe must be connected to the AUX PROBE 3 input. If there is an auxiliary boiler, the GHP' probe must also be connected to the AUX PROBE 2 input (Figure 4.12 *p. 35*). In the absence of an auxiliary boiler, the EXT.T outdoor temperature probe can be connected to the AUX PROBE 2 input (Figure 4.13 *p. 35*, see also Paragraph 4.8.2 *p. 34*).

Figure 4.11 *Connection of temperature probes to K18 appliance for heating service only*



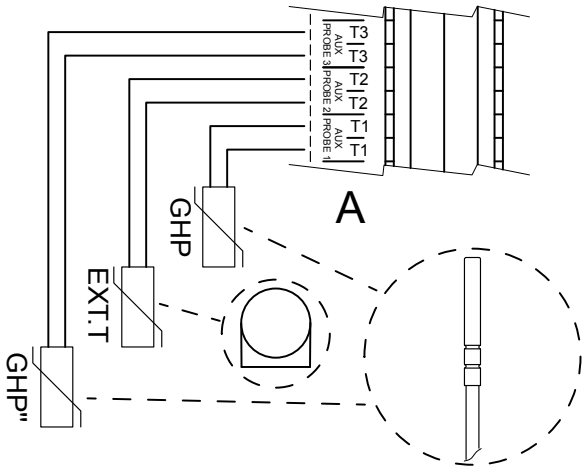
A	Unit terminal block detail
GHP	Water delivery temperature probe NTC 10k Beta 3977 (supplied as standard with K18 Simplygas unit)
EXT.T	Air temperature probe NTC 10k Beta 3977 (optional OSND007)

Figure 4.12 *Connection of temperature probes to K18 appliance with DHW directly controlled by the appliance with an auxiliary boiler*



A	Unit terminal block detail
GHP''	NTC 10k Beta 3977 DHW buffer tank probe (optional OSND004)
GHP'	NTC 10k Beta 3977 DHW charging circuit probe (optional OSND004)
GHP	Water delivery temperature probe NTC 10k Beta 3977 (supplied as standard with K18 Simplygas unit)

Figure 4.13 *Connection of temperature probes to K18 appliance with DHW directly controlled by the appliance without an auxiliary boiler*



A	Unit terminal block detail
GHP''	NTC 10k Beta 3977 DHW buffer tank probe (optional OSND004)
EXT.T	Air temperature probe NTC 10k Beta 3977 (optional OSND007)
GHP	Water delivery temperature probe NTC 10k Beta 3977 (supplied as standard with K18 Simplygas unit)

4.9 HOW TO CONNECT AN AUXILIARY HEAT GENERATOR

The K18 Simplygas appliance can control an auxiliary heat generator (typically a boiler) which can be operated either as an emergency only generator or as an integration (peak) generator. For further information refer to Paragraph 5.3.6 *p. 41*.
The auxiliary boiler can be controlled:

- By means of a simple ON/OFF request (provided by the ON/OFF AUX BOILER contact).
- By means of a 0-10 V signal (0-10V AUX BOILER) which can both provide the request signal and communicate the

desired water temperature setpoint.

► Optionally, if required by the specific auxiliary boiler, by means of the ON/OFF contact to control switching on and off and simultaneously the 0-10 V signal for water setpoint communication only.

If available, you can also connect the alarm signalling output of the auxiliary boiler to a specific input of the terminal block of the K18 Simplygas unit.

The output available on the auxiliary boiler must be a voltage-free contact and be suitable for SELV type signals (i.e. safety extra-low voltage), and therefore, it must have double insulation in comparison to parts powered by the mains.

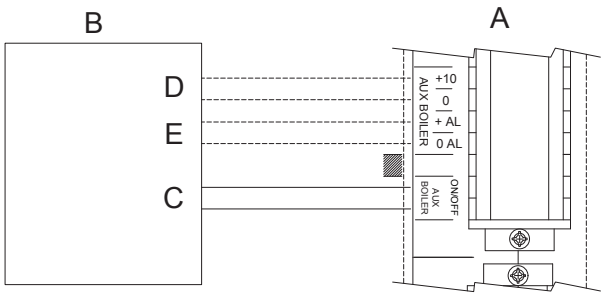
The auxiliary boiler integration and replacement operating mode requires the availability and the actual connection of the alarm signalling.

If the alarm signalling is not actually connected and available, when the control system requests the heat pump replacement with the auxiliary boiler (under the integration and replacement operating mode), the control system will not be able to reactivate the heat pump as the alarm status of the auxiliary boiler itself will not be known.

For the description of integration and replacement operating mode see Paragraph 1.1.5 *p. 7* and 5.3.6 *p. 41*.

After consulting the documentation of the heat generator to be used, connect the ON / OFF contact and/or 0-10 V signal and/or the alarm indicator, respectively, as shown in Figure 4.14 *p. 36*.

Figure 4.14 *ON/OFF request connection, optional 0-10 V output (temperature setpoint) and optional alarm signal for the auxiliary boiler on the unit terminal block*



A K18 Simplygas unit terminal block detail
B Auxiliary boiler
C ON/OFF contact request (2x0.75 mm² cable)
D 0-10V input for setpoint acquisition (*)
E Alarm signalling output (mandatory SELV voltage-free contact) (*)

(*) (optional); shielded cable 2x0.75 mm²

4.10 WINTER KIT (OKBT015)

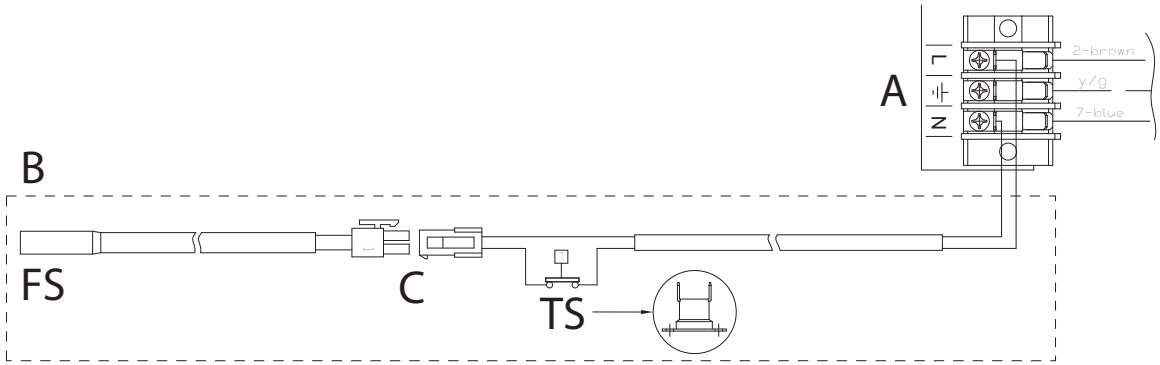
The use of the optional OKBT015 winter kit protects the condensate drain tray from freezing.

It consists of a heating cable, an antifreeze thermostat, and the relative electrical wiring.

For installation follow the instructions on the instruction sheet enclosed with the kit.

Following Figure 4.15 *p. 36* shows the winter kit wiring diagram.

Figure 4.15 *Connection of K18 Simplygas winter kit*



A Heat pump module electrical panel
B Winter kit (OKBT015)
C 2-way Molex connectors
FS Condensate discharge hose heating element
TS Condensate discharge heating element thermostat

5 FIRST START-UP

First start-up entails checking/setting up the combustion parameters and may exclusively be carried out by a Robur TAC. NEITHER the user NOR the installation technician is authorised to perform such operations, under penalty of voiding the warranty.

The installer is obliged to carry out preliminary checks described in Paragraph 5.1 *p. 36*.

5.1 PRELIMINARY CHECKS

Paragraph dedicated to the installer.

5.1.1 Preliminary checks for first start-up

Upon completing installation, before contacting the TAC the installer must check:

► Water, electrical and gas systems suitable for the required

capacities and equipped with all safety and control devices required by the regulations in force.
- ► Absence of leaks in the water and gas systems.
- ► Type of gas for which the appliance is designed (natural gas).
- ► Supply gas pressure complying with the values of Table 3.3 *p. 28*, with max tolerance ±15%.
- ► Power supply mains complying with the appliance's rating plate data.
- ► Appliance correctly installed, according to the manufacturer's instructions.
- ► System installed in a workmanlike manner, according to national and local regulations.

5.1.2 Abnormal or hazardous installation situations

Should any abnormal or hazardous installation situations be found, the TAC shall not perform first start-up and the appliance shall not be commissioned.
These situations may be:
- ► Appliance installed inside a room.
- ► Failed compliance with minimum clearances.
- ► Insufficient distance from combustible or flammable materials.
- ► Conditions that do not warrant access and maintenance in safety.
- ► Appliance switched on/off with the main switch, instead of the provided control device (OQLT021, OCDS007, or external request).
- ► Appliance defects or faults caused during transport or installation.
- ► Gas smell.
- ► Non-compliant mains gas pressure.
- ► Non-compliant flue gas exhaust.
- ► All situations that may involve operation abnormalities or are potentially hazardous.

5.1.3 Non-compliant system and corrective actions

Should the TAC find any non conformities, the user/installer is bound to perform any corrective procedures required by the TAC.
After performing the remedial actions (the installer's responsibility), if the TAC deems that safety and conformity conditions are in place, first start-up may be effected.

5.2 COMBUSTION PARAMETERS CHECK

Paragraph reserved exclusively to TACs.

Figure 5.1 *p. 38*.

1. If the appliance is running, switch it off with the applicable control system (OQLT021, OCDS007, external request).
2. Remove the cap over the offset adjustment screw (C).
3. Screw in completely the throttle adjustment screw (D).
4. Screw in completely the offset adjustment screw (C).
5. Unscrew the throttle adjustment screw (D) as indicated in Table 5.1 *p. 38*.
6. Unscrew the offset adjustment screw (C) as indicated in Table 5.1 *p. 38*.
7. Press the key on the user interface of the unit (detail B of Figure 1.9 *p. 16*) for 5 seconds to activate the chimney sweep function at minimum power.
8. The display shows the letters "CS.LO" (chimney sweep low power), alternating with the flashing message "UAIt" (wait) which indicates that the machine is not yet ready for the reading.
9. Once an approximate time ranging between 5 and 8 minutes elapses, the flashing message becomes "_GO_" to indicate that the combustion control can be implemented.
10. Ensure the CO_2 value is between values indicated in column "Minimal heat input" of Table 5.1 *p. 38*. Otherwise set CO_2 percentage reading by acting on the offset adjustment screw.
11. Press the key on the user interface again for 5 seconds to activate the chimney sweep function at maximum power.
12. The display shows the letters "CS.HI" (chimney sweep high power), alternating once again with the flashing message "UAIt" (wait) which indicates that the machine is not yet ready for the reading.
13. After a short while, the flashing message becomes "_GO_" again to indicate that the combustion control at maximum power can be implemented.
14. Ensure the CO_2 value is between values indicated in column "Nominal heat input" of Table 5.1 *p. 38*.

If the check is successful:

15. Press the key on the user interface again for 5 seconds to deactivate the chimney sweep function and complete the procedure.

If the check is not successful:

16. Set CO_2 percentage reading by acting on the throttle adjustment screw.
17. Press the key on the user interface again for 5 seconds to deactivate the chimney sweep function.
18. Repeat steps 7 to 10 to reactivate the chimney sweep function at minimum capacity; verify once again and if necessary, correct the CO_2 value in these conditions by actuating the offset adjustment screw.
19. Press the key on the user interface again for 5 seconds to activate the chimney sweep function at maximum capacity, and then again for 5 seconds to deactivate it and complete the procedure.

To ensure the chimney sweep function is executed properly, there must be adequate thermal load, otherwise the appliance could reach the maximum limit of the delivery and/or return temperature and then stop.

The following may be necessary to provide adequate thermal load, depending on the system characteristics:
- ■ Activate any pumps or zone valves of the water distribution circuit.
- ■ Fully open the manual or thermostatic valves, mounted on the radiators.
- ■ Activate the ventilation of the fan coils and increase the setting of any thermostat placed on them.

Table 5.2 *p. 38* shows the messages that can appear on the display while the chimney sweep function is running, the relative meaning and the optional actions required.

Limit the time you use the chimney sweep function to the minimum actually required.

The system automatically interrupts chimney sweep function after 20 minutes from activation.

If the required CO_2 settings cannot be reached, contact Robur.

Table 5.1 *Gas valve setting table for heat pump module*

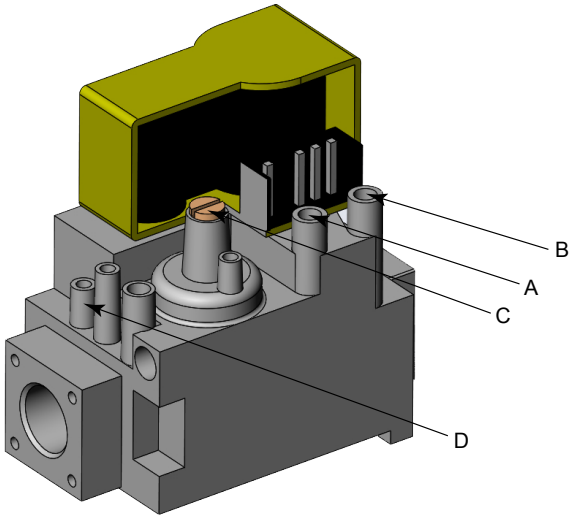
Gas	Gas network pressure	Screw pre-adjustment		Offset pressure	CO_2 percentage in fumes	
		Throttle	Offset	minimum	Minimal heat input	Nominal heat input
Type	mbar	turns	turns	Pa	%	%
G20	See Table 3.3 *p. 28*	-6 ¾	-3	-10	8,5 (1)	9,0 (2)

(1) 8,3 ÷ 8,7.
(2) 8,8 ÷ 9,2.

Table 5.2 *Display messages for chimney sweep function*

Message	Meaning	Action
CS.LO / UAlt	Chimney sweep function is active at minimum capacity and the flame is still not lit or lit at a different capacity than required.	Wait.
CS.LO / _GO_	Chimney sweep function is active at minimum capacity and the flame is lit at the required capacity.	Run CO_2 reading (minimum capacity).
CS.HI / UAlt	Chimney sweep function is active at maximum capacity and the flame is still not lit or lit at a different capacity than required.	Wait.
CS.HI / _GO_	Chimney sweep function is active at maximum capacity and the flame is lit at the required capacity.	Run CO_2 reading (maximum capacity).
HI.t	The appliance has switched off because the maximum operating temperature of the delivery and/or return water was exceeded.	Deactivate the function by pressing the ⬅ key for 5 seconds and then increase the thermal load before reactivating the function.
Err.	The appliance switched off due to a fault (Warning or Error).	Deactivate the function by pressing the ⬅ key for 5 seconds and then intervene according to the operating codes shown on the display, while referring to Section 8.1 *p. 51*. Once the problem is resolved, reactivate the function.
Cod.x (x = 0, 1, ..)	The appliance is temporarily running a special cycle that requires specific control of the power that is not compatible with the execution of the chimney sweep function.	In the rare event of one of these codes appearing, deactivate the function by pressing the ⬅ key for 5 seconds and then contact Robur.

Figure 5.1 *Heat pump module gas valve*



A Offset pressure intake
B Gas mains pressure intake
C Offset adjustment screw
D Throttle adjustment screw

5.3 SETTING PARAMETERS FOR FIRST START-UP

Paragraph reserved exclusively to TACs.

The instructions on the use of the GHP10/GHP11 electronic board concern the firmware version 1.015.

For the use of GHP10/GHP11 electronic board and related menu, see Section 6 *p. 44*.

Table 5.3 *Menu 4 parameters for startup*

Parameter	Do not modify	Description	Setting	Default
41		Activation period of auxiliary boiler request controlled in ON/OFF used for activation of circulating pump only	from 1 to 15 minutes	4
44		Temperature measurement unit	0. °C 1. °F	0
47		IF20 electronic board usage	1. generic controller 2. OQLT021 system controller	1
48		Building time constant	from 0 to 50 hours	10

Parameter	Do not modify	Description	Setting	Default
49		Auxiliary boiler installation type	0. not installed 1. hydraulic installation in parallel to K18, 0-10 V control 2. hydraulic installation in parallel to K18, ON/OFF control	0
50		Auxiliary boiler purpose for space heating	0. none (not active) 1. emergency (active only if K18 in alarm) 2. integration 3. integration and replacement	3
51		Auxiliary boiler purpose in DHW mode	0. none (not active) 1. emergency (active only if K18 in alarm) 2. integration 3. replacement (K18 does not produce DHW) 4. integration and replacement	4
52		Auxiliary boiler 0-10 V output temperature setpoint corresponding to 0 V	from 0 °C to 120 °C	0
53		Auxiliary boiler 0-10 V output temperature setpoint corresponding to 10 V	from 0 °C to 120 °C	80
54		Min auxiliary boiler 0-10 V output temperature setpoint for min ON (used for activation of circulating pump only)	from 0 °C to 120 °C	0
55		Auxiliary boiler alarm input management	0. unavailable (disabled) 1. normally open 2. normally closed	0
56		Idle time for automatic oil pump priming cycle activation	from 0 to 99 days 0. function disabled	10
156		Auxiliary boiler locking time for space heating	from 0 to 600 minutes	40
157		Auxiliary boiler locking time in DHW mode	from 0 to 600 minutes	20
163		Heating antifreeze function activated	0. not active 1. active	1
174		Modulation of circulation pump in space heating mode activated	0. not active 1. active	1
175	Do not modify	OFF drive voltage for heating circulation pump		0,7
176 (1)		ON drive voltage for circulation pump in space heating mode	from 0 V to 10 V	10
177 (2)		ON drive voltage for circulation pump in DHW mode	from 0 V to 10 V	10
178		Space heating mode water deltaT setpoint	from +1 K to +20 K	10
181		Power modulation enable for space heating	0. not active 1. active	1
182		Glycol in heating water loop	0. absent 1. present	0
183		Modulation of circulation pump in DHW mode activated	0. not active 1. active	1
184		DHW mode water deltaT setpoint	from +1 K to +20 K	10
185 (3)		Outdoor temperature threshold to enable auxiliary boiler in space heating	from -30 °C to 40 °C	40
187		Temperature differential for GAHP recovery after replacement with auxiliary boiler due to exceeding operational limits	0,0 replacement function disabled from 0.1 to 10.0 K return differential	3,0
198		Fan noise reduction	0. not active 1. active	0
200		Min flow rate for heating circulation pump	from 4 to 20 hundreds of liters/hour	4
203		Auxiliary boiler 0-10 V output temperature setpoint boost	from 0 K to 20 K	0
209		AUX 2 temperature probe usage	0. none (probe not installed) 1. auxiliary boiler probe for DHW service regulation 2. outdoor temperature probe 3. DHW buffer tank temperature probe	0
210		AUX 1 temperature probe usage	0. none (probe not installed) 1. probe for space heating regulation	1
211 (4)		Max delivery water setpoint for space heating	from 35 °C to 80 °C	40
212 (4)		Max inlet water setpoint for space heating	from 25 °C to 70 °C	30
213 (4)		Min delivery water setpoint for space heating	from 30 °C to 60 °C	30
214 (4)		Min inlet water setpoint for space heating	from 20 °C to 50 °C	20
215		Auxiliary boiler release integral	from 0 to 500 °C * minutes	30
216		Auxiliary boiler reset integral	from 0 to 500 °C * minutes	5
217 (5)		Low outdoor temperature threshold for replacing GAHP with auxiliary boiler	from -30 °C to 10 °C	-30
218 (6)		High outdoor temperature threshold for replacing GAHP with auxiliary boiler	from 10 °C to 40 °C	40
219 (7)		Delivery water temperature control for space heating	0. return 1. delivery	1

Parameter	Do not modify	Description	Setting	Default
220 (8)		Delivery water temperature control in DHW mode	0. return 1. delivery	1
225 (9)		Setpoint management	0. Fixed setpoint 1. heating curve	1
226 (9) (10)		Fixed water setpoint for space heating	The minimum and maximum values depend on what has been set in the installation stage	40
227 (9)		DHW setpoint with closed COM-DHW contact	from 10 °C to 80 °C	55
228 (9)		Heating curve slope for space heating	from 10 to 400	75
229 (9)		Heating curve offset for space heating	from -5 K to +5 K	0
230 (9)		Room temperature setpoint with heating curve for space heating	from 0 °C to 40 °C	20
236 (11)		Delivery water temperature setpoint increase (boost) for DHW service	from 1 K to 10 K	5
238		AUX 3 temperature probe usage	0. none (probe not installed) 1. outdoor temperature probe 2. DHW buffer tank temperature probe	0

1 If modulation of circulation pump in space heating mode is not active, i.e. parameter 174 set to 0.
2 If modulation of circulation pump in DHW mode is not active, i.e. parameter 183 set to 0.
3 Auxiliary boiler enabled if outdoor temperature < parameter 185.
4 Parameters 211 and 213 are used if parameter 219 has value 1 and parameters 212 and 214 are used if parameter 219 has value 0. If the unit is connected to OQLT021 system controller (parameter 47 set to 2) this parameter is ignored; in this case the maximum (or minimum) setpoint is fixed and corresponds to the maximum (or minimum) value set with the parameter.
5 Replacement if outdoor temperature < parameter 217.
6 Replacement if outdoor temperature > parameter 218.
7 If the system is set for regulation of space heating service using GHP probe (AUX PROBE 1, see parameter 210), regulation of course occurs on the pipe on which the probe is physically installed. However, it is still important to set this parameter correctly in order to allow the system to apply the correct maximum and minimum setpoint limits.
8 If the system is set for regulation of DHW service using GHP' probe (AUX PROBE 2, see parameter 209), regulation of course occurs on the pipe on which the probe is physically installed. However, it is still important to set this parameter correctly in order to allow the system to apply the correct maximum and minimum setpoint limits.
9 If the unit is connected to the OQLT021 system controller (optional) this parameter is ignored.
10 This parameter is ignored if parameter 225 is set to 1.
11 This parameter is ignored if the appliance does not directly manage DHW production.

5.3.1 Settings depending on the control system type

► If the OQLT021 system controller is used, set parameter 47 to 2.
► For other control systems, set parameter 47 to 1 (default).

5.3.2 Settings depending on glycol presence

Before doing these settings, read warnings in Paragraphs 3.5 *p. 26* and 3.7 *p. 26*.

► If has been added in the primary water circuit glycol, set parameter 182 to 1; additionally, the antifreeze function can be disabled by setting parameter 163 to 0.
► If glycol has not been added, set parameter 182 to 0 and make sure that parameter 163 is set to 1; also, keep the unit connected to power supply and to gas network, in order to allow antifreeze function activation.

5.3.3 Operating mode setting (ON/OFF or modulating)

Before doing this setting, it is strongly suggested to contact Robur technical support.

The operating mode is MODULATING by default. To set the unit in ON/OFF mode, set parameter 181 to 0

5.3.4 Settings depending on the primary circuit water pump type

The pump of K18 Simplygas C1 units is normally controlled by the appliance in variable flow rate mode, both in space heating and DHW service, with the objective to keep constant temperature differential (10 K default for both services) between water return and delivery in the whole range of the unit heat output; this regulation mode is appropriate for most of the applications. However it is possible:

► To modify temperature differential value required for space heating and/or DHW service, by setting respectively parameters 178 and 184. Before doing this, it is strongly suggested to contact Robur technical support.
► To modify the lower limit of water pump flow rate, by setting parameter 200. This can be necessary to problems correct low or nothing water circulation (possibly, only in some parts of the plant) when the pump is controlled by the system at a low flow rate.
► To set fixed flow rate pump operation, for space heating and/or DHW service:
  ■ Space heating service: set parameter 174 to 0, then set parameter 176 from 3 (minimum flow rate) to 10 (maximum flow rate).
  ■ DHW service: perform same settings as above, modifying parameters 183 and 177 respectively.

It is always possible to show the actual flow rate value measured by the appliance flowmeter. To do this, enter menu 0 and select parameter 24: the value shown is expressed in liters/hour.

5.3.5 Settings depending on the installed temperature probes

5.3.5.1 With OQLT021 system controller

Follow the instructions provided in the system controller installation manual.

5.3.5.2 With other control systems (OCDS007 chronothermostat or generic external request)

► Referring to Figure 3.2.4 *p. 22*, connect the GHP probe to AUX PROBE 1 input (see Paragraph 4.8 *p. 34*) and set parameter 210 to 1 (probe for space heating regulation).
► If the unit directly manages DHW production, it is necessary to install the temperature probe in the DHW buffer tank (GHP", detail 12 in Figure 3.2 *p. 23*) and connect it to the AUX PROBE 3 input (Paragraph 4.8.3 *p. 35*), assigning the value 2 (DHW buffer tank probe) to parameter 238 accordingly. It must be suitably installed (detail 10 in Figure 3.2 *p. 23*) and connected also the three-way diverter valve (Paragraph 4.5 *p. 32*). In the absence of the GHP" probe the K18 Simplygas appliance will behave as if DHW production is

managed by an external controller or is completely absent.

► Also in the case of direct management of DHW production by the appliance, if there is also an auxiliary boiler, it is necessary to install the DHW charging circuit temperature probe (GHP', detail 16 in Figure 3.2 *p. 23*) and connect it to the AUX PROBE 2 input (Paragraph 4.8.3 *p. 35*); then assign the value 1 (DHW regulation probe) to parameter 209.

► If weather compensation is activated (see Paragraph 6.6.1 *p. 46*), the installation of an outdoor temperature probe EXT.T (optional OSND007) is recommended; install this probe in north facing, protected by direct sunlight and far from heat sources (windows, discharges, ecc.) and connect it to AUX PROBE 2 input (see Paragraph 4.8 *p. 34*); set parameter 209 to 2 (outdoor temperature probe). If this probe is not installed weather compensation will be based on the value provided by outdoor temperature probe onboard unit, a little less accurate. However, if the system requires all three GHP, GHP' and GHP'' probes, the outdoor temperature probe cannot be installed. In this case the regulation based on climate curve can only use the value provided by the outdoor temperature probe installed onboard the appliance.

5.3.6 Settings depending on auxiliary heat source presence

To activate the control of an auxiliary boiler set parameter 49 to:

1. for auxiliary boiler controlled by 0-10 V signal
2. for auxiliary boiler controlled by ON/OFF signal

► With reference to the possible functions of the auxiliary boiler for the space heating service (see Paragraph 1.1.5 *p. 7* and further on in this Paragraph), set parameter 50 to:

1. for emergency mode
2. for integration mode
3. (default value) for integration and replacement mode

► In the presence of the DHW service, with reference to the possible functions of the auxiliary boiler for this service (see also further on in this Paragraph), set parameter 51 to:

0. to exclude the auxiliary boiler from operating on the DHW service (DHW produced exclusively with the K18 unit)
1. for the emergency mode (activation of the auxiliary boiler only in case of an alarm on K18 unit)
2. for the integration mode (activation of the auxiliary boiler in addition to the K18 unit, when necessary)
3. for replacement mode (DHW produced only with auxiliary boiler)
4. (default value) for the integration and replacement mode (activation of the auxiliary boiler in addition and, in certain conditions, in replacement of the K18 unit)

► Referring to Paragraph 4.9 *p. 35*, if auxiliary boiler is controlled by 0-10 V signal to communicate required setpoint (parameter 49 set to 1), it is necessary to configure the 0-10V AUX BOILER output voltage / temperature curve, in order to match the one required by the auxiliary boiler; this information must be available in the documentation provided by the auxiliary boiler manufacturer. Proceed as follows:

1. Set parameter 52 to the temperature value which must correspond to 0 V output.
2. Set parameter 53 to the temperature value which must correspond to 10 V output.
3. If the 0-10 V signal is also used as request signal (second case described in Paragraph 4.9 *p. 35*), parameter 54 must also be set to the temperature that corresponds to the minimum switch-on level of the auxiliary boiler; if this value can be varied from the configuration of the parameters of the auxiliary boiler, it must be set to the lowest possible value, and then set parameter 54 of the K18 unit accordingly.

Through this setting, the K18 unit requests a "dummy" service on the auxiliary boiler, providing the minimum setpoint value when only the water pump of the auxiliary boiler must be switched on.

If, on the other hand, the 0-10 V signal is only used to communicate the setpoint value, while the service request is activated from the ON/OFF request (third case described in Paragraph 4.9 *p. 35*), leave parameter 54 set to its default value (0 °C).

► With reference to Paragraph 4.9 *p. 35*, if the auxiliary boiler is only controlled from the ON/OFF request, parameter 41 must be adequately configured. In order to do this:

1. Obtain the switch-off delay of auxiliary boiler circulating pump with respect to the switch-off of the heat source (in the case of a boiler: burner switch-off) by referring to the documentation of the auxiliary boiler or alternatively, verifying experimentally; generally, this delay lasts a few minutes.
2. Set parameter 41 to the next lower value (for example, if the switch-off delay is 3 minutes, set parameter 41 to 2).

Through this setting, the K18 unit briefly activates the ON/OFF request, according to the timing set in parameter 41, when only the circulating pump of the auxiliary boiler must be switched on.

► With reference to Paragraph 4.9 *p. 35*, if the auxiliary boiler can provide an alarm signal if the boiler itself is unavailable (for this purpose, refer to the documentation provided by the manufacturer of the auxiliary boiler), this signal can be controlled by setting parameter 55 to:

1. if the alarm signal of the auxiliary boiler is normally open (NO)
2. if the alarm signal of the auxiliary boiler is normally closed (NC)

The availability and actual connection and configuration of the auxiliary boiler alarm signal is **necessary** for the integration and replacement operating mode of the auxiliary boiler to be used (parameter 50 set to 3 and/or parameter 51 set to 4).

► The setpoint value communicated by 0-10 V signal to the auxiliary boiler can be increased by a constant boost value with respect to the actual system setpoint. This is sometimes useful to guarantee that the outlet manifold can actually reach the setpoint, even despite water mixing occurring on the secondary circuit. If required, set parameter 203 to the desired boost value. It is recommended to limit the boost value to that which is strictly needed.

► It is possible to inhibit auxiliary boiler operation in integration mode for space heating service (not for DHW service) above a set outdoor temperature threshold.

- To use this function, set parameter 185 to the desired outdoor temperature threshold value.
- To disable this function, set parameter 185 to maximum value (40 °C).

Even when inhibited by the above function, the auxiliary boiler remains active for the emergency function.

The function uses the filtered value with a constant time

of 30' with respect to the instantaneous value as the outdoor temperature.

Integration and replacement mode on space heating service

If the control mode of the auxiliary boiler is integration and replacement (parameter 50 set to 3 by default), the system uses certain replacement criteria of the heat pump for the space heating service, using only the auxiliary boiler. The replacement criteria can be modified or inhibited by using certain parameters.

1. Replacement at low outdoor temperature: the heat pump is replaced with the auxiliary boiler if the outdoor temperature drops **below** a given value. This criterion is particularly useful when the system requires a particularly high delivery temperature (which exceeds also the operating limits of the heat pump) when the outdoor temperature is very low.
   - To use this feature, set the threshold value of the outdoor temperature in parameter 217.
   - To deactivate the replacement function, set parameter 217 to the minimum value allowed (-30 °C, default value).
2. Replacement at high outdoor temperature: the heat pump is replaced with the auxiliary boiler if the outdoor temperature rises **above** a given value. This criterion is particularly useful in systems with low water content and low energy demand with respect to the power of the heat pump.
   - To use this feature, set the threshold value of the outdoor temperature in parameter 218.
   - To deactivate the replacement function, set parameter 218 to the maximum value allowed (40 °C, default value).

Even these two replacement functions use the filtered value of the outdoor temperature.

3. Replacement on heat pump limit thermostating condition: the heat pump is replaced with the auxiliary boiler if the delivery and/or return temperature of the heat pump exceeds the permissible operating limits (see Table 1.2 *p. 17*). Every 25' the system verifies whether the heat pump can be reactivated. This function can be modified or deactivated from parameter 187.
   - To use this function, set parameter 187 to a value other than 0.0; a high value makes it less likely for the heat pump to be reactivated, thereby ensuring more stable system operation; a low value favours the reactivation of the heat pump but makes it more likely for the limit thermostating condition to reoccur.
   - To deactivate the replacement function, set parameter 187 to the minimum value allowed (0.0 K).
   - The function is active by default and the value is set to 3.0 K.

Integration and replacement mode on DHW service

If the control mode of the auxiliary boiler is integration and replacement (parameter 51 set to 4 by default), the system uses certain replacement criteria of the heat pump for the DHW service, similarly to that for the space heating service.
The criteria used are those described in points 1 and 3 for the space heating service and therefore, replacement at low outdoor temperature (depending on parameter 217) and replacement on limit thermostating condition (depending on parameter 187). On the other hand, no criterion of replacement at high outdoor temperature is used.

5.3.7 Settings depending on water setpoint mode for the space heating service

With OQLT021 system controller

Follow the instructions provided in the OQLT017 system controller installation manual (for example, to set the heating curves, which are directly managed by such controller).

With other control systems (OCDS007 chronothermostat or generic external request)

It is possible to set the K18 Simplygas appliance to provide the space heating service using a fixed water setpoint, or a variable setpoint which depends on the outdoor temperature (weather compensated control; this option is strongly recommended).

- ► To set fixed water setpoint mode, set parameter 225 to 0; then set parameter 226 to the desidered setpoint value (Paragraph 6.6.2 *p. 47*).
- ► To set variable setpoint mode depending on outdoor temperature:
  1. Set parameter 225 to 1.
  2. Access menu 2 and select parameter "_26", display must show "2._26" (refer to procedure Paragraph 6.5 *p. 45*).
  3. Press button Enter: display shows the blinking code "rPF1".
  4. Press again button Enter.
  5. Then follow the instructions in Paragraph 6.6.1 *p. 46*.

To restart a locked-out unit, refer to Paragraph 6.7 *p. 48*.

5.3.8 Settings depending on DHW production mode

5.3.8.1 With OQLT021 system controller

Follow the instructions provided in the system controller installation manual.

5.3.8.2 With direct control of DHW production from the K18 appliance

In order for the K18 appliance to directly manage the DHW production, it is essential that the probe in the DHW buffer tank (GHP", Paragraph 5.3.5.2 *p. 40*) is correctly connected and configured.

In this case the COM-DHW contact assumes the function of selector of the setpoint to be used, referred to the temperature of the water in the DHW buffer tank, measured by the GHP" probe (and no longer to the delivery or return temperature from the K18 appliance):

- ► If the COM-DHW contact is closed, the value of parameter 227 is used as the DHW buffer tank setpoint.
- ► If the COM-DHW contact is open, the value of parameter 237 is used as the DHW buffer tank setpoint.
- ► In the particular case of open COM-DHW contact and parameter 237 set to 0 (default value), the DHW production request is deactivated.

In addition, the activation of the DHW production mode is independent of the status of the COM-REQ contact and depends solely on the configuration of the DHW production parameters and the status of the COM-DHW contact.

5.4 DIRECT CONTROL OF DHW PRODUCTION FROM THE K18 APPLIANCE

In order for the K18 appliance to directly manage the DHW production, it is essential that the probe in the DHW buffer tank (GHP'', Paragraph 5.3.5.2 *p. 40*) is correctly connected and configured.

5.4.1 DHW charge cycle management

In all DHW production service management modes, a charge cycle is managed with the criteria detailed below.

5.4.1.1 Activation

The K18 appliance is activated for DHW production when the temperature measured by the GHP'' probe is lower than the value of the active setpoint (parameter 227/237 according to the status of the COM-DHW contact), reduced by the value of parameter 235 (differential for starting the DHW charge).
For example if parameter 227 is set to 55 °C and parameter 235 is set to 5 K, the K18 appliance will be activated for DHW production, with COM-DHW contact closed, if the temperature measured by the GHP'' probe is lower than (55-5) = 50 °C.
Simultaneously with the activation of DHW production, the diverter valve is switched to the DHW position.

The DHW production service therefore always has priority over the space heating service.

5.4.1.2 Deactivation

The K18 appliance is switched off for DHW production when the temperature measured by the GHP'' probe is higher than the value of the active setpoint (parameter 227/237 according to the status of the COM-DHW contact).
For example, if parameter 227 is set to 55 °C, the K18 appliance will be switched off for DHW production, with COM-DHW contact closed, if the temperature measured by the GHP probe'' is equal or higher than 55 °C.
At the end of the DHW charging cycle, the diverter valve is switched to the heating position only when the heating service is required.

5.4.2 DHW production service management modes

The methods available for the DHW production service managed directly by the K18 appliance are the following (alternatives):

1. Fixed comfort setpoint 24 hours/day
2. Fixed comfort setpoint with the possibility to deactivate the DHW request via external request (comfort / OFF)
3. Fixed comfort setpoint or DHW buffer tank antifreeze protection via external request (comfort / antifreeze)
4. Variable setpoint (comfort and reduced) according to programming (with external timer)
5. Fixed setpoint with anti-legionella function (with external timer)

5.4.2.1 Fixed comfort setpoint 24 hours/day

► COM-DHW contact: not connected
► Parameters to set: 237
This mode must be chosen when you want the DHW request to be active continuously, with the aim of keeping the DHW buffer tank at the temperature set in parameter 237 at all times.
The COM-DHW contact must be left open and parameter 237 must be set to the desired temperature value for DHW buffer tank.
This is the most energy-intensive mode, as the system always maintains the temperature in the DHW buffer tank around the setpoint value set in parameter 237. More precisely, between the value (parameter 237 - parameter 235) and the value (parameter 237).
The only way to deactivate the DHW request is to manually change the value of parameter 237 to a lower value (or to the value 0 if you want to deactivate the request completely).

5.4.2.2 Fixed comfort setpoint with the possibility to deactivate the DHW request via external request (comfort / OFF)

► COM-DHW contact: connected to switch or daily/weekly timer
► Parameters to set: 227 (leave or reset parameter 237 to 0)
This mode should be chosen when you want to have the possibility to activate the DHW request only in the presence of a signal coming from a switch or timer.
In this case the COM-DHW contact must be connected to the request signal from the external switch or timer (SELV NO voltage-free contact) and the required DHW setpoint must be set in parameter 227; parameter 237 must be left at the default value 0.
The K18 appliance will be available for DHW production only if required by the external switch or timer; under these conditions it will keep the DHW buffer tank temperature around the value set in parameter 227. More precisely, between the value (parameter 227 - parameter 235) and the value (parameter 227). Otherwise, DHW production will be switched off.

5.4.2.3 Fixed comfort setpoint or DHW buffer tank antifreeze protection via external request (comfort / antifreeze)

► COM-DHW contact: connected to switch or daily/weekly timer
► Parameters to set: 227, 237
This mode should be chosen when you want to have the possibility to activate the DHW request only in the presence of a signal coming from a switch or timer, but keeping the DHW buffer tank always protected from freezing.
In this case, the COM-DHW contact must be connected to the request signal from the external switch or timer (SELV NO voltage-free contact) and both parameter 227, which represents the value of the DHW buffer tank setpoint in case of active DHW service request, and parameter 237, which corresponds to the DHW buffer tank setpoint for its frost protection (recommended value 7÷10 °C), must be set appropriately.

Pay attention to the value of the differential (parameter 235) whose default is 5 °C, because before reactivation of the DHW charge the temperature in the DHW buffer tank can drop down to (parameter 237 - parameter 235). Therefore, if the value of parameter 237 is not high enough and the value of parameter 235 is too high, there is in fact no protection of the DHW buffer tank against freezing.

The K18 appliance will keep the DHW buffer tank temperature around the value of the comfort setpoint, set in parameter 227, if required by the external switch or timer (COM-DHW contact closed). Otherwise it will keep the DHW buffer tank temperature around the value set in parameter 237 (which corresponds to the DHW buffer tank setpoint for antifreeze protection).

5.4.2.4 Variable setpoint (comfort and reduced) according to programming (with external timer)

► COM-DHW contact: connected to a daily/weekly timer
► Parameters to set: 227, 237
This mode must be chosen when you want to have the possibility to activate the DHW request on two different setpoints in

the presence of a signal coming from a timer, on which the time slots must be set. This is the typical scenario in which you want to have the buffer tank at a higher temperature (comfort) in the peak usage time slots, while in the others you use a lower setpoint (reduced).
In this case the COM-DHW contact must be connected to the request signal from the external timer (SELV NO voltage-free contact) and both parameter 227, which represents the value of the comfort setpoint of the DHW buffer tank, and parameter 237, which corresponds to the reduced setpoint of the DHW buffer tank, must be set appropriately.
The K18 appliance will keep the DHW buffer tank temperature around the value of the comfort setpoint, set in parameter 227, if required by the external timer (COM-DHW contact closed). Otherwise it will keep the DHW buffer tank temperature around the value of the reduced setpoint, set in parameter 237.

5.4.2.5 Fixed setpoint with anti-legionella function (with external timer)

► COM-DHW contact: connected to a daily/weekly timer
► Parameters to set: 227, 237

This mode must be chosen when you want to have the possibility to activate the DHW request on a comfort setpoint and activate the anti-legionella thermal disinfection in the presence of a signal coming from a timer, on which the periodicity and duration must be set.
In this case the COM-DHW contact must be connected to the request signal from the external timer (SELV NO voltage-free contact) and both parameter 227, which represents the value of the anti-legionella disinfection setpoint of the DHW buffer tank, and parameter 237, which corresponds to the comfort setpoint of the DHW buffer tank, must be set appropriately.
The K18 appliance will keep the DHW buffer tank temperature around the value of the anti-legionella setpoint, set in parameter 227, if required by the external timer (COM-DHW contact closed). Otherwise it will keep the DHW buffer tank temperature around the value of the comfort setpoint, set in parameter 237.

5.4.3 Delivery temperature

The water delivery setpoint used by the K18 appliance during DHW service will be the sum of the value of parameter 227 or 237 (depending on the status of the COM-DHW contact) and the value of parameter 236.
Parameter 236 expresses the increase in the delivery water temperature setpoint compared to the setpoint in the DHW buffer tank (expressed by parameters 227/237) which is necessary to achieve adequate heat exchange in the DHW buffer tank.
For example, if parameter 227 is set to 55 °C and parameter 236 is set to 5 K, the setpoint value for the delivery water temperature in the event of a DHW request with COM-DHW contact closed will be (55+5) = 60 °C.

5.4.4 Correct setting of DHW parameters

The DHW production service always has priority over the space heating service so, in case of an active DHW request, the three-way diverter valve will be switched on the DHW service until the DHW request is satisfied, ignoring any space heating requests coming from the system.

Setting a setpoint too high for the DHW buffer tank will mean that the K18 appliance will not be able to achieve it and will therefore not be able to return to the space heating service, generating a potential lack of comfort in heated rooms.

The correct parameters setting for the DHW production service, therefore, becomes decisive not only from an energy and economic point of view, in order to obtain maximum efficiency from the K18 appliance, but also to correctly meet both the DHW and space heating service requests.

6 NORMAL OPERATION

This section is for the end user.

6.1 WARNINGS

General warnings

Prior to using the appliance carefully read the warnings in Chapter III.1 *p. 4*, providing important information on regulations and on safety.

First startup by TAC

First start-up may exclusively be carried out by a Robur TAC (Chapter 5 *p. 36*).

Never power the appliance off while it is running

NEVER power the appliance off while it is running (except in the event of danger, Chapter III.1 *p. 4*), since the appliance or system might be damaged.

6.2 SWITCH ON AND OFF (HEATING SERVICE)

Routine switching on/off

The appliance may be exclusively switched on/off using proper control device (OQLT021, OCDS007 or external request).

Do not switch on/off with the power supply switch

Do not switch the appliance on/off with the power supply switch. This may be harmful and dangerous for the appliance and for the system.

Checks before switching on

Before switching on the appliance, ensue that:
- gas valve open
- appliance electrical power supply (main switch GS ON, Figure 4.2 *p. 31*)
- OQLT021 or OCDS007 power supply (if present)
- water circuit ready and filled

6.2.1 How to switch on/off

► If the appliance is controlled by the OQLT021 controller, refer

to the relevant manual.

► If the appliance is controlled by OCDS007 programmable thermostat or by external request (e.g. thermostat, timer, switch, ... with voltage-free NO contact), the appliance is switched on/off by the ON/OFF positions of the external control device.

After switching on with the control, in normal operating conditions, the appliance starts/stops automatically according to the user's thermal needs, supplying hot water at the programmed temperature.

Although the external request is in the "ON" position, this does not mean the appliance will start immediately, but it will only start when there are actual service demands.

6.3 SWITCH ON AND OFF (DHW SERVICE)

Do not switch on/off with the power supply switch

Do not switch the appliance on/off with the power supply switch. This may be harmful and dangerous for the appliance and for the system.

Checks before switching on

Before switching on the appliance, ensue that:

- gas valve open
- appliance electrical power supply (main switch GS ON, Figure 4.2 *p. 31*)
- OQLT021 or external timer power supply (if present)
- water circuit ready and filled

6.3.1 How to activate/deactivate the DHW service request

► If DHW production is managed by the OQLT021 controller, refer to the relevant manual.

► If the K18 appliance directly manages DHW production, the appliance is switched on/off according to the temperature measured by the GHP'' probe in the DHW buffer tank and to the parameters set on the K18 appliance (Paragraph 5.4.1 *p. 43*).

In normal operating conditions, the appliance starts/stops automatically according to the DHW buffer tank thermal needs, supplying hot water at the programmed temperature.

6.4 MESSAGES ON THE DISPLAY

6.4.1 4 digit display

The GHP10/GHP11 board of the appliance (Paragraph 1.5 *p. 16*) is equipped with a 4-digit display (detail A Figure 1.9 *p. 16*), visible through the sight glass (reference I Figure 1.3 *p. 10*).

► When the appliance is powered, all the LEDs switch on for 3 sec, then the central hyphens of the four digits are switched on, and lastly the GHP10/GHP11 board name is displayed in two subsequent stages (GHP during the first stage and 10/11 during the second).

► After 5 sec, the appliance is ready to operate.

6.4.2 Signals in normal operation

► During normal operation, water temperature values alternate on the display: output, input and the difference between the two.

6.4.3 Events reporting

When they occur, the display of the GHP10/GHP11 board shows three types of events, recognizable by the first character:

► "I" for information

► "u" for warning

► "E" for errors

The other three red digits represent a numeric event code.

Info events are shown steadily while warnings and errors blink.

The display rotates after the values of the outlet water temperature, the inlet and the difference between them.

If multiple events are active, they are shown in sequence, ordered by increasing code number.

If warning or error events are active, the left green symbol, shown together with water temperature data, blinks.

If it is a permanent error or warning the appliance stops.

For details about information, errors and warnings codes see Tables 8.1 *p. 51* and 8.2 *p. 51*.

6.4.4 Menu navigation

Once the menu list has been accessed (see Paragraph 6.5 *p. 45*), the display shows:

► First green digit on the left indicates menu number (eg. "0.", "1.", "2.", ... "8.").

► The last three red digits on the right indicate a parameter code or value, among those included in the selected menu (e.g. "__6" "_20", "161").

(e.g. menu+parameter "1.__6", "2._20", "3.161").

6.5 ON-BOARD ELECTRONIC CONTROLS – MENUS AND PARAMETERS OF THE GHP10/GHP11 BOARD

6.5.1 Selection keys

One of the following actions may be done with the GHP10/GHP11 board selection keys (references B, C and D in Figure 1.9 *p. 16*):

► Enter the menu list (by pressing the Enter key the first time).

► Scroll the menu list, or a series of parameters in a menu (by pressing keys ←, →).

► Select a menu or a parameter (pressing the key Enter).

► Edit and confirm the setting of a parameter (pressing keys ← and → and confirming with key Enter).

► Execute a command (pressing key Enter).

► Exit a menu and go back to the higher level by selecting the letter "E" which is displayed at the end of the menu list or of a series of parameters in a menu.

The letter "E" is displayed at the end a menu parameters list, and indicates the exit to go back to the higher level by pressing Enter.

6.5.2 Menus and parameters

The menus may be display only (functional data or parameters), display and setting (parameters) or control (reset).

► Display menus: menu "0" and menu "1".

► Command menu: menu "2" to execute error reset command (Paragraph 6.7 *p. 48*).

► Visualization and setting menu (for the user): menu "3" to display or set certain system parameters (eg. water temperature setpoint); the settings are initialised by the TAC upon first start-up; the Table 6.1 *p. 46* shows parameters in menu 3.

► Visualization and setting menu (to be exclusively used by the installer and TAC): menu "4." (for the installer) "5." and "6." (for the TAC). They are password protected. These are specific sections, exclusively intended for qualified personnel

(installer or TAC). For information see the Service manual.

Before accessing menus and parameters

1. Power supply switch "ON".
2. Display of the GHP10/GHP11 board showing in sequence the detected water temperature data (if the appliance is in normal operation), and eventually the flashing warning and error codes (if the appliance is in failure).

How to access the menus and parameters

1. Remove the display transparent cover (detail I Figure 1.3 *p. 10*) by removing the four fixing screws.
2. Press the Enter key once to display the menus: the first menu is displayed, "0." (= menu 0).
3. Press the → to scroll down and display the other/subsequent menus; the menu numbers will be displayed in order, "1.", "2.", ... , "6." ... or "E" (= exit).
4. Select the menu of interest (e.g. display "2.___" = menu 2) by pressing the Enter key; the first parameter code will be displayed, in order in the menu (e.g. display "2._21" = parameter 21 in menu 2).
5. Press the → to scroll down the other parameters in the menu; the codes will be displayed in order (e.g. display "2._21", ... "2._26" = parameters 21, ... 26 in menu 2), or letter "E" (= exit) at the end of the list.
6. Edit the parameter of interest by pressing key Enter the display will show the current parameter value (blinking) or, for a command menu, a blinking code (eg. "rEr1" for the board error reset command).
7. Press the Enter key to reconfirm the figure; or use ← and → keys to modify the figure, and press Enter at the end to confirm or set the new figure; if however, it is a matter of controlling an appliance operation, press the Enter key to execute it.
8. To exit a parameter menu or the menu list and go back to the higher level, press the → until displaying the letter "E" for exit, then press the Enter key again.
9. The water temperature values alternate again on the display: output, input and the difference between them.
10. Fit the display transparent cover.

Table 6.1 *Menu 3 parameters (for the user)*

Parameter	Description	Setting	Default
44	Temperature display format	0. °C 1. °F	0
48	Building time constant	from 0 to 50 hours	10
163	Antifreeze function	0. not active 1. active	1
198	Fan noise reduction	0. not active 1. active	0
225 (1)	Setpoint source	0. Fixed setpoint 1. heating curve	1
226 (1) (2)	Fixed setpoint in heating operation	The minimum and maximum values depend on what has been set in the installation stage.	
227 (3)	DHW setpoint with closed COM-DHW contact	from 10 °C to 80 °C	55
228 (1) (4)	Heating curve slope	from 10 to 400	75
229 (1) (4)	Heating curve offset	from -5 K to +5 K	0
230 (1) (4)	Room setpoint with heating curve	from 0 °C to 40 °C	20
235 (1) (5)	Differential for DHW buffer tank charge start	from 1 K to 10 K	5
237 (1) (5)	DHW setpoint with open COM-DHW contact	from 0,1 °C to 80,0 °C 0,0 DHW charge disabled with COM-DHW contact open	0,0

1 If the unit is connected to the OQLT021 system controller (optional) this parameter is ignored.
2 This parameter is ignored if parameter 225 is set to 1.
3 When the K18 appliance directly manages DHW production, parameter 227 represents the setpoint in the DHW buffer tank when COM-DHW contact is closed and is used in conjunction with parameter 237. If the K18 appliance does not directly manage DHW production, parameter 227 represents the setpoint of the delivery water temperature (or return, depending on the value of parameter 220) of the K18 appliance.
4 This parameter is ignored if parameter 225 is set to 0.
5 This parameter is ignored if the appliance does not directly manage DHW production.

6.6 MODIFYING SETTINGS

Do not modify complex settings

Specific technical and system knowledge is required for complex settings. Contact a TAC.

The settings described in this section does not apply when using the OQLT021 system controller. Refer to the system controller installation manual for detailed instructions about its settings.

6.6.1 How to modify the heating curve

This kind of regulation is active if parameter 225 (menu 3) is set to value 1 (default).

The heating curve makes it possible to change the system's outlet water temperature according to the measured outdoor temperature and to the internal ambient setpoint temperature.
Depending on the type of system, in particular the type of exchangers (radiators, fan coils, floor heating etc.) and the characteristics of the building, a specific curve will be used, selected from the family of climatic curves; furthermore, upon changing the internal room setpoint temperature, the curve actually used will be automatically modified.
The family of heating curves is shown in Figure 6.1 *p. 47* and the curve to be used is chosen by specifying the value of parameter 228 in menu 3 which indicates the curve slope. The curve defined in this way refers to an internal ambient setpoint temperature of 20 °C (68 °F). If the setpoint temperature is different, the system automatically adapts the curve used.

To set the adequate heating curve operate as specified below:

1. Set the flow water temperature according to the expected minimum outdoor temperature (for instance: Twater = 60 °C when Toutside = -10 °C).
2. Using the chart in Figure 6.1 *p. 47*, select the curve that meets the above requirement (in the specific case curve with slope 1.5).
3. **Multiply the slope of the selected curve by 100** and set the figure thus obtained in menu 3 parameter 228 (in the example set parameter 228 to value 150).

If no curve passes through the established point, select an intermediate figure between those of the curves immediately above or immediately below this point. Indicatively, a system that uses floor radiant heat exchangers will use "low" slope figures, a fan coil system will use “medium” figures and a system with radiators "high" figures.

4. Ensure parameter 229 (heating curve offset) of menu 3 is set at 0.
5. Set parameter 230 (room setpoint with climatic curve) of menu 3 to the desired value (default setting 20 °C).

Unit operation is based on the heating curve ONLY if the setting of parameter 225 (menu 3) is at 1 (default setting - see Table 5.3 *p. 38*).

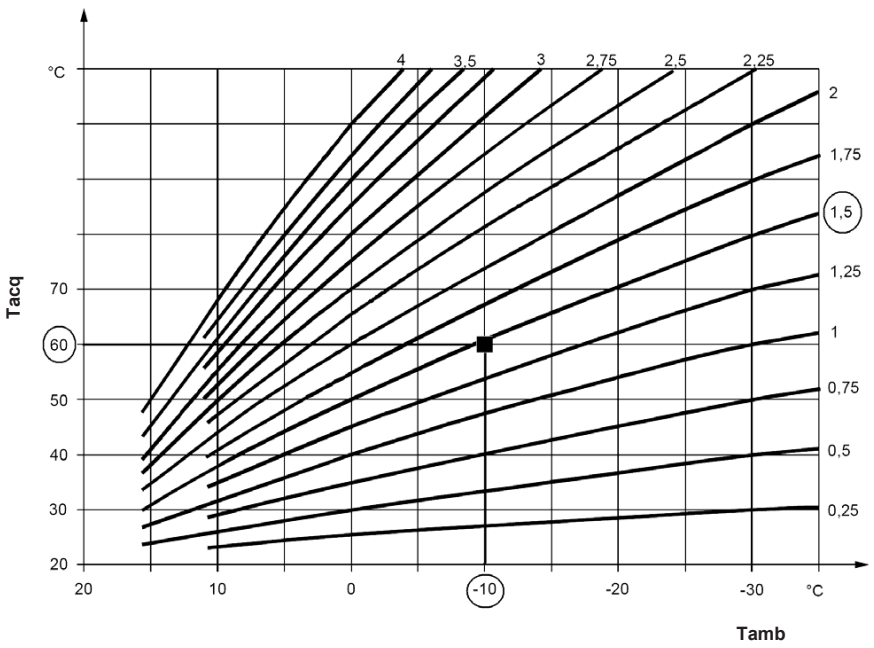
If the slope of the selected curve is not correct the following cases may occur, to be assessed during early operation of the system:

- Ambient temperature lower when outdoor temperature is lower: in this case, the slope of the curve is not sufficient, it is needed to set a higher value for parameter 228, indicating the slope of the curve.
- Internal ambient temperature is higher when the outdoor temperature is lower: in this case the curve slope is excessive, a lower figure must be set for parameter 228 indicating curve slope.

If however the slope is correct (stable internal ambient temperature when the outdoor temperature changes), but the internal temperature does not match the setpoint one, the following cases may occur:

- Internal ambient temperature is always higher than the setpoint: in this case one must act on the Offset parameter of the heating curve, setting a negative figure equal to the internal temperature deviation from the setpoint; for instance, if the setpoint is 22 °C and the actual internal temperature is 24 °C, set the Offset parameter (parameter 229) to -2 °C.
- Internal ambient temperature is always lower than the setpoint: in this case a positive figure must be set for the Offset parameter of the heating curve; for instance, if the setpoint is 20 °C and the actual internal temperature is 19 °C, set the Offset parameter (parameter 229) to 1 °C.

Figure 6.1 *Heating curves for internal ambient temperature = 20 °C*



6.6.2 How to raise/lower the water temperature setpoint (fixed setpoint)

The water temperature set-point establishes the outlet temperature to the system (water output from the appliance), or inlet from the system (water input in the appliance). The temperature is pre-set by the TAC upon first start-up.
The water setpoint is set on outlet by default.

Fixed setpoint regulation is used if parameter 225 is set to 0.

In general, regulation based on heating curve, described in Paragraph 6.6.1 *p. 46*, provides better results in terms of comfort and efficiency. Contact Robur technical Support before changing the regulation mode.

To raise/lower the water temperature setpoint, through the GHP10/GHP11 board, proceed as follows (see also Paragraph 6.5 *p. 45*):

1. Access menu 3 parameter 225 (= setpoint origin) with keys Enter and ⬅ ➡; set parameter 225 to 0 (fixed setpoint - see Table 6.1 *p. 46*).
2. Set parameter 226 (fixed setpoint in heating operation) to the desired temperature setting.

3. Exit menu 3 by pressing the ➡ key until displaying the letter "E" for exit, then press the Enter key.
4. The water temperature values alternate again on the display: output, input and the difference between them.

6.6.3 How to raise/lower the DHW setpoint

The DHW setpoint determines the temperature of the DHW buffer tank, if there is or is not a DHW request from a switch or a daily/weekly timer. The temperature setting is set by the TAC at the first start-up.
By default the water setpoint is set when the external DHW request contact (COM-DHW) is closed.

To raise/lower the DHW temperature setpoint, through the GHP10/GHP11 board, proceed as follows (see also Paragraph 6.5 *p. 45*):

1. Access menu 3 parameter 227 (= DHW setpoint with COM-DHW contact closed) with keys Enter and ⬅ ➡; set parameter 227 to the desired temperature setting.
2. If needed, also change the setting of parameter 237 (= DHW setpoint with open COM-DHW contact) to the desired temperature value.
3. Exit menu 3 by pressing the ➡ key until displaying the letter "E" for exit, then press the Enter key.
4. The water temperature values alternate again on the display: output, input and the difference between them.

6.7 RESTARTING A LOCKED-OUT UNIT

6.7.1 Fault signals on the display

In the event of locked-out appliance, an operational code flashes on the display (first green figure on the left, letter "u" = warning or "E" = error).
► To restart the appliance you must know and perform the procedure concerning the issue signalled and identified by the code (Paragraph 8.1 *p. 51*).
► Only act if you are familiar with the issue and with the procedure (technical expertise and professional qualifications might be required).
► If you do not know the code, the problem, or the procedure, or you do not have sufficient skills, and in any case of doubt, contact the TAC.

6.7.2 Locked-out appliance

An external intervention (reset or repair) is required due to an appliance fault or problem with the system.
► A reset may be enough for a temporary and provisional fault.
► For a fault or breakdown, alert the maintenance technician or TAC.

6.7.3 Reset

There are three options for resetting a fault:
1. If the appliance is connected to the OQLT021 system controller, you may act through the control device, as described in the relevant manual.
2. If a remote reset button has been provided (Paragraph 4.7 *p. 34*) act directly on the button.
3. Act on unlock/reset button under unit display (reference J Figure 1.3 *p. 10*).

6.8 EFFICIENCY

For increased appliance efficiency:
► Keep the finned coil clean.
► Set the maximum water temperature and climatic curve at the actual installation requirement.
► Reduce repeated switch-ons to the minimum (low loads).
► Program appliance activation for actual periods of use.
► Keep water and air filters on plumbing and ventilation systems clean.
► Deactivate or reduce the DHW request setpoint when DHW service is not required, while still maintaining antifreeze protection in the DHW buffer tank.

7 MAINTENANCE

7.1 WARNINGS

Correct maintenance prevents problems, assures efficiency and keeps running costs low.

Maintenance operations described herein may exclusively be performed by the TAC or skilled maintenance technician.

Any operation on internal components may exclusively be performed by the TAC.

Before performing any operation, switch off the appliance by means of the control device and wait for the end of the shutdown cycle, then disconnect power and gas supply, by acting on the electrical disconnector and gas valve.

The efficiency checks and every other "check and maintenance operation" (see Tables 7.1 *p. 49* and 7.2 *p. 49*) must be performed with a frequency according to current regulations or, if more restrictive, according to the provisions set forth by the manufacturer, installer or TAC.

Responsibility for efficiency checks, to be carried out for the aims of restricting energy consumption, lies with the system manager.

Environmental or operational heavy conditions

In environmental or operational conditions particularly heavy (for example: heavy-duty use of the appliance, salty environment, etc.), maintenance and cleaning operations must be more frequent.

7.2 PRE-EMPTIVE MAINTENANCE

For pre-emptive maintenance, comply with the recommendations in Table 7.1 *p. 49*.

Table 7.1 *Guidelines for the preventive maintenance operations*

		K18 Simplygas
Guidelines for the preventive maintenance operations		
Check of the unit	visually check of the general condition of the unit and of its finned coil	√ (1)
	check the correct operation of the device used for monitoring the water flow	√
	check the % value of CO_2	√
	check that the condensate discharge is clean (If necessary, frequency of the maintenace operation must be increased)	√
	replace the belts after 6 years or 12000 hours of operation	√
	replace the oil pump motor condenser every 3 years or every 10000 operating hours or whenever the condenser capacity is less than 95% of the nominal value	√

(1) It is suggested to clean the finned coil once every 4 years (optimal frequency of the cleaning operation is in any case strongly affected by the installation site). Avoid excessively aggressive cleaning of the finned coil (e.g. high-pressure washer).

7.3 SCHEDULED ROUTINE MAINTENANCE

For scheduled routine maintenance, perform the operations in Table 7.2 *p. 49*, at least once every 2 years.

Table 7.2 *Scheduled routine maintenance*

		K18 Simplygas
Ordinary scheduled maintenance		
Check of the unit	clean the combustion chamber	√ (1)
	clean the burner	√ (1)
	clean the ignition and flame sensor electrodes	√
	check that the condensate discharge is clean	√

(1) Only in case the analysis of combustion products is non-compliant.

7.4 PERIODS OF INACTIVITY

Avoid emptying the installation

Emptying the system may cause damage due to corrosion of the water pipes.

Deactivate the system in winter

Should you intend to stop the appliance in the winter season, ensure at least one of the following conditions:

1. antifreeze function active (Paragraph 3.5 *p. 26*)
2. sufficient antifreeze glycol (Paragraph 3.7 *p. 26*)

7.4.1 Prolonged periods of inactivity

► Should you foresee to leave the appliance inactive for a long period of time, disconnect it from the electrical and gas mains. These operations must be performed by qualified personnel.

How to deactivate the appliance for long periods of time

1. Switch the appliance off (Paragraph 6.2 *p. 44*).
2. Only when the appliance is completely off, power it off with the main switch/disconnector switch (Detail GS in Figure 4.2 *p. 31*).
3. Close the gas valve.
4. If necessary, add water with glycol (if the appliance is disconnected from the power and gas mains, the active antifreeze protection is missing, Paragraph 3.5 *p. 26*).

How to reactivate the appliance after long periods of inactivity

Before reactivating the appliance, the operator/maintenance technician of the system must first of all:

- Check whether any maintenance operations are required (contact the TAC; see Paragraphs 7.2 *p. 49* and 7.3 *p. 49*).
- Check content and quality of the water in the system, and if necessary top it up (Paragraphs 3.9 *p. 27*, 3.8 *p. 27* and 3.7 *p. 26*).
- Ensure the flue gas exhaust duct is not obstructed, and that the condensate drain is clean.

After completing the above checks:

1. Open the gas valve and ensure there are no leaks; should gas smell be noticed, close the gas valve again, do not switch any electrical devices on and request intervention by qualified personnel.
2. Power on with the main power supply switch (GS, Figure 4.2 *p. 31*).
3. Switch on the appliance using the provided control device (OQLT021, OCDS007 or external request, Paragraph 4.4 *p. 31*).

7.5 TEMPORARY STOP COMMAND OF THE FAN

During some maintenance operations the air flow from the fan may be annoying for the operator.

It is possible to stop temporarily the fan by acting on the GHP10/GHP11 board as follows:

1. Access menu 2 in Parameter "_27", display must show "2._27" (procedure Paragraph 6.5 *p. 45*).
2. Press button Enter: display shows the blinking code "OFan".

3. To stop the fan press again button Enter.

To enable the fan operation again:

1. Access menu 2 and select Parameter "_28", display must show "2._28" (refer to procedure Paragraph 6.5 *p. 45*).
2. Press button Enter: display shows the blinking code "lFan".
3. Press again button Enter.

To exit the menu 2 and return to the main screen:

1. Press button → until the rightmost digit shows letter "E" (Exit), then press button Enter.
2. Press again button → until the leftmost shows letter "E" (Exit), then press button Enter.

Limit the time you use this function to the minimum effectively needed. The system cancels the fan stop automatically after 15 minutes.

8 DIAGNOSTICS

8.1 BOARD CODES

Table 8.1 *Informative codes*

Code	Description	Info (I)
405	Outdoor temperature exceeding operational limits	The code is reset automatically when the triggering condition ceases.
406	Outdoor temperature below operational limits	The code is reset automatically when the triggering condition ceases.
430	Generator protection cycle activated	The event indicates the activation of the protection cycle in case of high flue temperature.
435	Gas valve antifreeze function activated	It is activated when the antifreeze cycle starts and it is stopped when the antifreeze cycle ends.
452	Defrosting cycle activated	The code clears automatically when execution of defrosting ends.
457	Generator anti condensation cycle activated	The anti-condensation cycle ensures that once the flame is turned on, it stays on until the conditions that guarantee the absence of condensation occur.
458	Service request filtering activation	The message appears when there are too frequent requests for activation, and so the appliance establishes a minimum turn-on and turn-off time before switching off or on again.
459	Possible flue obstruction	The control informs that, after flame ignition , the temperature measured by the flue probe is not the expected one; this could be due to a possible flue discharge duct obstruction.
462	Pre-ignition phase	The event indicates that the unit is performing the pre-ignition cycle.
479	Heating antifreeze function activated	The code clears automatically when antifreeze function execution ends.

Table 8.2 *Operative codes*

Code	Description	Warning (u)	Error (E)
401	Limit thermostat trip	NA	Contact the TAC.
402	Flue gas thermostat trip	Contact the TAC.	
407	High generator temperature	Reset is automatic when the triggering condition ceases.	The reset may be done following one of procedures shown in Paragraph 6.7.3 *p. 48*. If the code persists, shows up again or in case of doubt, contact the TAC.
408	Flame controller error	NA	Contact the TAC.
410	Low hot water flow	Reset is automatic when the triggering condition ceases.	Check and clean water filters on the system. Check for air in the system. Check water flow pump. Power cycle the appliance. The reset may be done following one of procedures shown in Paragraph 6.7.3 *p. 48*. If the code persists, shows up again or in case of doubt, contact the TAC.
411	Insufficient rotation of oil pump	Reset occurs automatically 20 minutes after the code is generated.	The reset may be done following one of procedures shown in Paragraph 6.7.3 *p. 48*. If the code persists, shows up again or in case of doubt, contact the TAC.
412	Flame controller lockout	Reset is automatic up to 4 attempts (in about 5 minutes).	Check gas supply. If the code persists or in case of doubt, contact the TAC. The reset may be done following one of procedures shown in Paragraph 6.7.3 *p. 48*.
413	Flame controller communication error	Reset is automatic when the triggering condition ceases.	The reset may be done following one of procedures shown in Paragraph 6.7.3 *p. 48*. If the code persists, shows up again or in case of doubt, contact the TAC.
414	Flame controller not compatible	NA	Contact the TAC.
415	Flame controller parameters error	NA	Contact the TAC.
416	Hot water delivery temperature probe fault	NA	The reset may be done following one of procedures shown in Paragraph 6.7.3 *p. 48*. If the code persists, shows up again or in case of doubt, contact the TAC.
417	Hot water inlet temperature probe fault	NA	The reset may be done following one of procedures shown in Paragraph 6.7.3 *p. 48*. If the code persists, shows up again or in case of doubt, contact the TAC.

Code	Description	Warning (u)	Error (E)
420	Generator temperature probe fault	NA	The reset may be done following one of procedures shown in Paragraph 6.7.3 *p. 48*. If the code persists, shows up again or in case of doubt, contact the TAC.
424	Flue gas temperature probe fault	Reset is automatic up to 5 attempts.	The reset may be done following one of procedures shown in Paragraph 6.7.3 *p. 48*. If the code persists, shows up again or in case of doubt, contact the TAC.
425	Clogged condensate drain	NA	Check and clean condensate discharge. Reset is automatic when the triggering condition ceases. It is also possible to make the reset following one of procedures shown in Paragraph 6.7.3 *p. 48*. If the code persists, shows up again or in case of doubt, contact the TAC.
426	Generator fins temperature probe fault	Reset is automatic up to 5 attempts.	The reset may be done following one of procedures shown in Paragraph 6.7.3 *p. 48*. If the code persists, shows up again or in case of doubt, contact the TAC.
430	High flue gas or generator fins temperature	Reset is automatic when the triggering condition ceases.	The reset may be done following one of procedures shown in Paragraph 6.7.3 *p. 48*. If the code persists, shows up again or in case of doubt, contact the TAC.
435	Gas valve temperature probe fault	Reset is automatic when the the functioning probe is restored.	NA
436	Blower fault	Reset occurs automatically 20 minutes after the code is generated.	The reset may be done following one of procedures shown in Paragraph 6.7.3 *p. 48*. If the code persists, shows up again or in case of doubt, contact the TAC.
438	Internal flame controller error	Reset occurs automatically 10 seconds after the code is generated.	The reset may be done following one of procedures shown in Paragraph 6.7.3 *p. 48*. If the code persists, shows up again or in case of doubt, contact the TAC.
439	Fan fault	The system tries to resolve the fault once; if not successful, warning 461 is generated.	NA
441	Parasitic flame lockout	NA	The reset may be done following one of procedures shown in Paragraph 6.7.3 *p. 48*. If the code persists, shows up again or in case of doubt, contact the TAC.
442	Flame loss	Reset occurs automatically 10 seconds after the code is generated.	NA
443	Flame controller communication error	Reset is automatic when the triggering condition ceases.	The reset may be done following one of procedures shown in Paragraph 6.7.3 *p. 48*. If the code persists, shows up again or in case of doubt, contact the TAC.
444	Evaporator temperature probe fault	NA	The reset may be done following one of procedures shown in Paragraph 6.7.3 *p. 48*. If the code persists, shows up again or in case of doubt, contact the TAC.
446	High hot water inlet temperature	Check configuration of other heat generators on the system. Ensure the secondary circuit pump is working. Ensure the exchange terminals are active. Check any bypasses between outlet and inlet. Reset is automatic and occurs if the generating condition ceases with circulating pump on or 20 minutes after the code is generated with circulating pump off.	NA
447	Hot water inlet temperature below operational limits	Reset occurs automatically when the generating cause resolves or 430 seconds after the code is generated.	Reset is automatic when the triggering condition ceases. If the code shows up again or in case of doubt contact the TAC.
448	High hot water differential temperature	Check cleanliness of water filters. Check water flow. Reset occurs automatically 20 minutes after the code is generated.	The reset may be done following one of procedures shown in Paragraph 6.7.3 *p. 48*. If the code shows up again or in case of doubt contact the TAC.
449	Missing additional board	NA	Contact the TAC.
450	Found additional board	NA	Contact the TAC.
460	Defrosting valve has failed to open	Non-blocking event. Reset is automatic, however, it is advisable to contact the TAC.	The reset may be done following one of procedures shown in Paragraph 6.7.3 *p. 48*. Contact the TAC.

Code	Description	Warning (u)	Error (E)
461	Fan fault	Generated as a result of a failed attempt are restoring warning 439; it is resumed once the generating cause is resolved. If the code persists, contact the authorized TAC.	NA
463	Oil pump priming cycle activated	The priming cycle lasts 30' if activated manually or 10 minutes if activated automatically. Reset is automatic when the triggering condition ceases.	NA
471	DHW buffer tank probe fault (connected to AUX 3)	Reset is automatic when the triggering condition ceases.	NA
472	DHW buffer tank probe fault (connected to AUX 2)	Reset is automatic when the triggering condition ceases.	NA
473	Manifold probe fault (connected to AUX 2)	Reset is automatic when the triggering condition ceases.	NA
474	Manifold probe fault (connected to AUX 1)	Reset is automatic when the triggering condition ceases.	NA
478	High hot water delivery temperature	Check cleanliness of water filters. Check water flow. Reset is automatic when the triggering condition ceases.	NA
480 80	Incomplete functional parameters Invalid configuration parameters	Contact the TAC.	
481	Invalid bank 1 parameters	Reset is automatic when the triggering condition ceases.	Contact the TAC.
482	Invalid bank 2 parameters	Reset is automatic when the triggering condition ceases.	Contact the TAC.
485	Invalid module type configuration parameters	NA	Contact the TAC.
486	ROM board fault	NA	Contact the TAC.
487	pRAM board fault	NA	Contact the TAC.
488	xRAM board fault	NA	Contact the TAC.
489	Registers board fault	NA	Contact the TAC.
490	Outdoor temperature probe fault	NA	The reset may be done following one of procedures shown in Paragraph 6.7.3 *p. 48*. If the code persists, shows up again or in case of doubt, contact the TAC.
491	Electronic board fault	NA	Contact the TAC.
492	Weather probe fault (connected to AUX 1)	Reset is automatic when the triggering condition ceases.	NA
493	Weather probe fault (connected to AUX 2)	Reset is automatic when the triggering condition ceases.	NA
494	Weather probe fault (connected to AUX 3)	Reset is automatic when the triggering condition ceases.	NA
495	Auxiliary boiler fault	NA	The restore is automatic and is run after the alarm is reset, which is to be run **on the auxiliary boiler** (refer to the documentation of the manufacturer of the auxiliary boiler with regards to the alarm signalling modes and their resetting operations). If the reset is successful, i.e. the auxiliary boiler stops signalling the alarms, but the code persists and reappears, or if in doubt, contact the Robur TAC; otherwise, contact the TAC of the manufacturer of the auxiliary boiler for the problem to be resolved.

NA: Not Applicable

8.2 WATER PUMP ALARM CODES

Table 8.3 *Water pump alarm codes*

LED indicator pattern	Meaning	Operational status	Cause	Remedial action
Steady green light	Pump ON	Pump runs according to setup	Normal operation	---
Fast blinking green light	---	Pump in standby	Normal operation	---
Alternately blinking between green and red light	Pump ready but not running	Pump will start as soon as the error is cleared	Undervoltage U<160 V or overvoltage U>253 V	Check power supply voltage 195 V <U<253 V
			Air bubbles in water circuit	Disconnect PWM connector until LED turns into permanent green light, then reconnect PWM connector
			Over temperature of the module Motor temperature too high	Check fluid temperature and ambient temperature
Blinking red light	Pump out of order	Pump blocked	Pump does not restart autonomously	Replace the pump
OFF	No power supply	No voltage on electronics	The unit has never received a service request since it has been powered electrically, or more than one hour has elapsed since the last service request was completed; in these cases the control electronics of the appliance do not power the pump. It is a normal operating mode	---
			The pump is not connected to the power output supplied by the control electronics of the appliance	Check cable connection
			LED failure	Check if pump is actually running
			Failure of electronics	Replace the pump
			The control electronics of the appliance do not activate the power output of the pump although there is a service request	If the power output of the pump does not supply voltage, check the cabling of the electrical panel; if no fault is found, try replacing the GHP10/GHP11 board

9 APPENDICES

9.1 PRODUCT FICHE

Figure 9.1

Table 8

COMMISSION DELEGATED REGULATION (EU) No 811/2013

Technical parameters for heat pump space heaters and heat pump combination heaters

Model(s):	K18 Simplygas
Air-to-water heat pump:	yes
Water-to-water heat pump:	no
Brine-to-water heat pump:	no
Low-temperature heat pump:	no
Equipped with a supplementary heater:	no
Heat pump combination heater:	no
Parameters shall be declared for medium-temperature application.	
Parameters shall be declared for average, colder and warmer climate conditions.	

Item	Symbol	Value	Unit	Item	Symbol	Value	Unit
AVERAGE CLIMATE CONDITIONS							
Rated heat output (*)	*Prated*	14,3	kW	**Seasonal space heating energy efficiency**	η_s	126	%
Declared capacity for heating for part load at indoor temperature 20 °C and outdoor temperature Tj				Declared coefficient of performance or primary energy ratio for part load at indoor temperature 20 °C and outdoor temperature Tj			
Tj = –7 °C	*Pdh*	12,6	kW	Tj = –7 °C	*PERd*	112	%
Tj = +2 °C	*Pdh*	7,7	kW	Tj = +2 °C	*PERd*	128	%
Tj = +7 °C	*Pdh*	5,0	kW	Tj = +7 °C	*PERd*	138	%
Tj = +12 °C	*Pdh*	2,2	kW	Tj = +12 °C	*PERd*	141	%
T_j = bivalent temperature	*Pdh*	-	kW	Tj = bivalent temperature	*PERd*	-	%
Annual energy consumption	Q_{HE}	84	GJ				
COLDER CLIMATE CONDITIONS							
Rated heat output (*)	*Prated*	13,7	kW	**Seasonal space heating energy efficiency**	η_s	119	%
Declared capacity for heating for part load at indoor temperature 20 °C and outdoor temperature Tj				Declared coefficient of performance or primary energy ratio for part load at indoor temperature 20 °C and outdoor temperature Tj			
Tj = –7 °C	*Pdh*	8,4	kW	Tj = –7 °C	*PERd*	118	%
Tj = +2 °C	*Pdh*	5,1	kW	Tj = +2 °C	*PERd*	129	%
Tj = +7 °C	*Pdh*	3,3	kW	Tj = +7 °C	*PERd*	134	%
Tj = +12 °C	*Pdh*	1,5	kW	Tj = +12 °C	*PERd*	134	%
Tj = bivalent temperature	*Pdh*	-	kW	Tj = bivalent temperature	*PERd*	-	%
T_j = operation limit temperature	*Pdh*	13,7	kW	Tj = operation limit temperature	*PERd*	92	%
For air-to-water heat pumps: T_j = –15 °C (if TOL < –20 °C)	*Pdh*	11,2	kW	For air-to-water heat pumps: Tj = –15 °C (if TOL < –20 °C)	*PERd*	98	%
Annual energy consumption	Q_{HE}	102	GJ				
WARMER CLIMATE CONDITIONS							
Rated heat output (*)	*Prated*	17,4	kW	**Seasonal space heating energy efficiency**	η_s	131	%
Declared capacity for heating for part load at indoor temperature 20 °C and outdoor temperature Tj				Declared coefficient of performance or primary energy ratio for part load at indoor temperature 20 °C and outdoor temperature Tj			
Tj = +2 °C	*Pdh*	17,4	kW	Tj = +2 °C	*PERd*	128	%
Tj = +7 °C	*Pdh*	11,1	kW	Tj = +7 °C	*PERd*	130	%
Tj = +12 °C	*Pdh*	5,1	kW	Tj = +12 °C	*PERd*	137	%
Tj = bivalent temperature	*Pdh*	-	kW	Tj = bivalent temperature	*PERd*	-	%
Annual energy consumption	Q_{HE}	64	GJ				
Bivalent temperature	T_{biv}	TOL < $T_{designh}$	°C	For air-to-water heat pumps: Operation limit temperature	*TOL*	-22	°C
				Heating water operating limit temperature	*WTOL*	65	°C
Power consumption in modes other than active mode				Supplementary heater			
Off mode	P_{OFF}	0,000	kW	Rated heat output	*Psup*	-	kW
Thermostat-off mode	P_{TO}	0,015	kW	Type of energy input		monovalent	
Standby mode	P_{SB}	0,005	kW				
Crankcase heater mode	P_{CK}	-	kW				
Other items							
Capacity control		variable		For air-to-water heat pumps: Rated air flow rate, outdoors	—	4000	m³/h
Sound power level, indoors/outdoors	L_{WA}	- / 65	dB	For water- or brine-to-water heat pumps: Rated brine or water flow rate, outdoor heat exchanger	—	-	m³/h
Contact details	Robur SPA, Via Parigi 4/6, I-24040 Zingonia (BG)						

(*) For heat pump space heaters and heat pump combination heaters, the rated heat output *Prated* is equal to the design load for heating *Pdesignh* , and the rated heat output of a supplementary heater *Psup* is equal to the supplementary capacity for heating *sup(Tj)* .

Additional information required by COMMISSION REGULATION (EU) No 813/2013, Table 2:

Emissions of nitrogen oxides:	NO_x	32	mg/kWh

Robur mission

Robur is dedicated to dynamic progression
in research, development and promotion
of safe, environmentally-friendly, energy-efficiency products,
through the commitment and caring
of its employees and partners.

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